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USEFUL RECEIPTS.

To Preserve Beans and Peas.

A new method of keeping the above quite fresh for any length of time, so that they shall lose neither their taste nor original softness, has been lately introduced into notice by A. Albert, of Paris. Take the beans when not much bigger than large peas, and pursue the following directions for both vegetables:

Plunge them for a minute in boiling and afterwards in cold water, and after having washed off the water, spread them out for several hours on canvas frames. Then place them in an oven slightly heated on frames covered with paper, leave them long enough to be of the same warmth as the oven, and then expose the frames to a current of air until the articles are cold. The frames are then to be replaced in the oven and again exposed to the air, these operations being repeated until the beans or peas are perfectly dry, not so as to break, but almost like beans dried naturally. The articles should be gathered and dried on the same day, if not, they should be left during the night in the oven; they should be kept in dry and clean bottles, and to each bottle of beans there should be added a bunch of dry savory. Before using the vegetables they should be steeped for some hours in tepid, or over night in cold water; if they are beans the water is thrown away and they are cooked in the usual manner, but if peas, they are only just covered with the water, which will be entirely absorbed, and they are cooked like green peas. Vegetables prepared in this manner are quite as good as if they had been just gathered.—[Genie Industriel.

Coloring Black.—Scruples about becoming a Subscriber.

I called on an individual, in this place, and advised him to subscribe for the Scientific American, but he had doubts about becoming a subscriber. He said, however, if you could tell him how to color a black on cotton and wool, that is, a cotton white weft, and a woolen white warp, without injuring the cloth, he would then believe you understood your business, and would take your paper. I want to be clearly understood: the cloth is white composed of wool and cotton. The person I speak of is a cloth manufacturer. J. T.

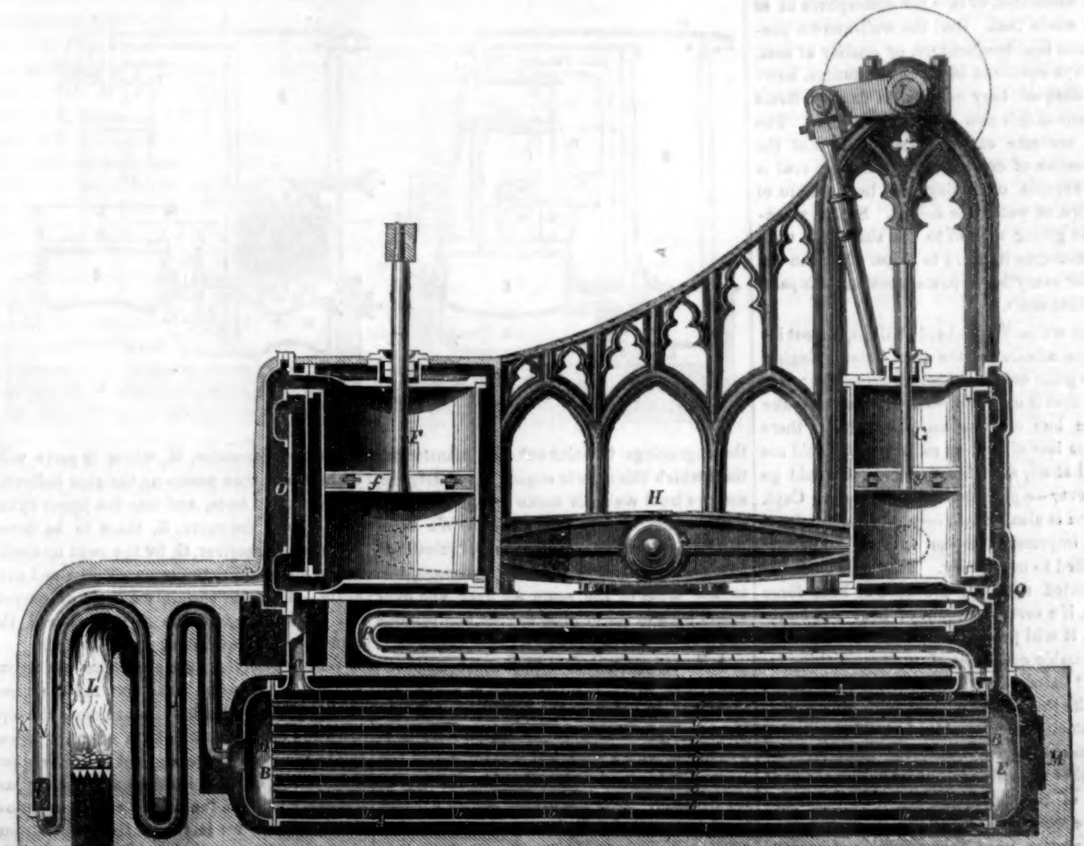
Aiva, Canada West, Jan. 12th, 1853.

[We are not solicitous about the scrupulous gentleman's patronage, but we can do the very thing he wants. We know how to color a piece of white goods, half cotton and half wool, a good black, and not injure the quality of the goods as much as if it were composed of cotton and wool dyed separately. We can furnish practical receipts for doing this or any other color whatever.

A Golden Fashion.

The latest Paris fashion is powdering the hair with gold dust and filings of silver. This fashion will suit California and Australia; but the expensiveness of the powder is likely to speedily explode the fashion.

ERICSSON'S CALORIC ENGINE.---Figure 1.



We will now present a "History of the Caloric Engine," accompanied with such remarks as our readers expect us to make.

Figure 1 is a longitudinal vertical section of Capt. Ericsson's first Caloric Engine, patented in England in 1833, and described in Sir Richard Phillips' "Arts of Life," published the same year.

"A is the regenerator, consisting of a cylindrical vessel, closed at the ends by the plates, B B; through these plates a number of small tubes, C, pass from end to end, terminating in the caps, D and E, thus forming a free communication between them, but not communicating with the body of the regenerator. A number of division plates, *b*, divide the regenerator into as many chambers, and these are made to communicate with each other, by segments being cut out alternately from the tops and bottoms of the division plates. The tubes, C, are also provided with division plates, or small metallic discs, placed in opposite directions to each other. F is the working cylinder of the engine, called the hot cylinder. G is a smaller cylinder, called the cold cylinder, which receives the air that escapes from the former, and then forces it back again, for every stroke of the piston, thereby keeping up a constant circulation of the impelling medium and promoting a constant transfer of heat. The pistons of the two cylinders are connected by a beam, H, side-rods, and cross-heads, similar to a common marine-engine, and the cylinders are provided with slide-valves, nearly of the common construction, moved by suitable gear from eccentrics fixed on the crank shaft, I.

J is one of a series of pipes inclosed in a stove, K, acted upon by a fire, L, the combustion being supported by ordinary draught, caused to circulate round the regenerator, and passing off from M, into a chimney. The pipes, J, in the stove, all terminate at one end, in the cap, D, and at the other end in the pipe, N, which communicates with the slide-box, O, of the hot cylinder. P represents a cooler, and consists of one or more pipes, exposed to some cooling medium, these being, like the longitudinal pipes in the regenerator, provided with a number of metallic discs.

Previous to describing the action of the engine, let us suppose that the stove with its pipes and the working cylinder, have been brought to some considerable temperature, and likewise the regenerator with its tubes brought to the same temperature nearest to the stove, gradually lessening so as to be, at the opposite end, equal in temperature with the surrounding atmosphere. By examining the positions of the slide-valves, as represented in figure 1, it becomes evident that if air be, by some means, forced or pumped into the caps of the regenerator, such air will on the one hand, find its way through the stope-pipes, &c., into the top-part of the hot cylinder, and on the other hand, through the connecting-pipe, Q, into the top-part of the cold cylinder. Now, since the hot cylinder is larger, say double the size of the cold cylinder, it follows that the power of the piston, *f*, will vanquish the power of the piston, *g*, and make it ascend, at the same time itself descending: thus motion will be produced, and the crank-shaft begin to revolve, and, by reversing the position of the slide-valves, when the pistons have performed their full strokes, that motion will be continued.

By further examining figure 1, it will be seen that the cold cylinder receives its supply of air from the *body* of the regenerator through the cooler, P, and the pipe, *p*, entering under the slide valves, it will also be seen that the hot-air from the hot cylinder escapes under the slide-valves, through the pipe, *n*, into the body of the regenerator,—hence the same air that escapes from the hot cylinder supplies the cold one. In like manner it will be found, by referring to fig. 1, that the air forced from the cold-cylinder into the cap, E, must pass through the pipes of the regenerator, stove-pipes, &c., to supply the hot cylinder.

From what has been already said, the action of the engine, and the transfer of the heat become almost self-evident; it need, therefore only be briefly stated, that the hot-air, in escaping from the hot-cylinder, will, during its passage through the body of the regenerator, give out its heat to the tubes, C, being, by the peculiar arrangement of the division plates, *b*, compelled to ply round those tubes. And the cold air, coming from the cold cylinder, will, in its passage through the tubes, C, naturally take up the heat imparted to them, its particles being kept in a constant state of change by the small metallic discs. A transfer of heat being thus effected, it becomes evident that the office of the cooler will be that of carrying away any heat from the air which has not been taken up in the regenerator, and that the office of the stove will be to give an additional quantity of heat to the circulating air, previous to its entering the hot cylinder, in order to make up for a small deficiency which will always be unavoidable in the transferring process, besides the losses caused by radiation.

The power of the engine will mainly depend on the density of the circulating medium, —accordingly, by having a small pump attached to the engine, the power and pressure may be varied at pleasure. High pressure will, of course, produce the greatest proportionate effect; since the losses, by radiation, will remain the same under whatever pressure.

The trial engine, which has been erected by the inventor, and the action of which has been found in every respect satisfactory, may be fairly estimated at five horse-power; it makes fifty-six revolutions per minute, having a break wheel fixed on the fly-wheel shaft, loaded with upwards of five thousand pounds weight. The working cylinder is fourteen inches in diameter, and the cold cylinder ten and a quarter inches in diameter, both making eighteen inches stroke, working under a pressure of thirty-five pounds to the square inch. The regenerator, in this trial engine, is eight inches and a half in diameter, and seven feet six inches long, containing seven tubes, of two inches diameter each; and its operation is so

perfect that all the heat lost, that is, heat not returned to the engine, does not amount to more than three pounds of fuel per hour. The total consumption of fuel is nearly two pounds per horse-power in the hour, owing to the great radiating surfaces unavoidable in an engine on a small scale, while these surfaces have not, in this first instance, been properly protected by any imperfect conductors.

The principle of this new engine consists in this, that the heat which is required to give motion to the engine at the commencement, is returned by a peculiar process of transfer, and thereby made to act over and over again, instead of being, as in the steam engine, thrown into a condenser, or into the atmosphere as so much waste fuel. And the well-known phenomenon that temperature, or quality of heat, is always equalized between substances, however unequal they may be in density, forms the basis of this new application of heat. The most accurate experiments prove that the combustion of one pound of the best coal is only capable of raising the temperature of 9000 lbs. of water one degree. So that an engine, in giving motion to the shaft of a mill, will consume from 7½ to 8 lbs. of fuel in the hour for every horse-power constantly imparted to that shaft."

Thus writes Sir Richard Phillips, a most inordinate admirer of the then Caloric Engine. Let us point out its fallacious principles: it is stated that it only uses so much coal to make up the loss of radiation, therefore, if there were no loss of heat by radiation, it would use no coal at all, after the first fire; it would go on for ever—a perpetual motion surely. Capt. Ericsson is also, or has been, laboring under a wrong impression of the value of "Forces," as applied to machinery. Thus this engine is constructed upon the principle of heat force that is, if a certain amopnt of heat can be retained, it will produce repeated effects upon innumerable quantities of matter—a thing totally at variance with Mechanical Philosophy. It is like this: 900° of heat will give a certain velocity to 900 cubic feet of air, during one stroke of a piston, then the same velocity to another 900 cubic feet of air during the next stroke of the piston, and so on *ad infinitum*. If there were no loss by radiation, and none by exhaustion, upon this principle of reasoning, 500° of heat will give rapid motion to *x* cubic feet of air, and, by so doing, give motion to machinery for ever.

It is a great mistake to suppose that this can be done, for action and re-action are equal —we are no believers in motion derived from static pressure. What is heat? It is the effect of the disturbance of chemical equilibrium like the lightning from the positive seeking the negative cloud. The amount of this disturbance is exactly in proportion to the quantity of fuel used to produce the effect—the fire is just like the electric battery. The amount of this force is more economically employed or directed in some machines or engines than others, but a certain quantity of action cannot produce an infinite amount of re-action. It is, however, upon this principle, that the Caloric Engine is built, and that it is fallacious, we leave to the judgment of every mechanical philosopher. Thus, for example, take this first engine of Capt. Ericsson, and let us cover up all the metallic parts, so that there will be no loss by radiation, and what will we have then, but this engine (by its author's reasoning), going on continually, giving out force without any expenditure of fuel at all, after a certain amount of heat has been imparted to a certain amount of air. But if there were no loss of heat by radiation, the engine would soon stop, and thus we hold, that what some people would call *loss*, is nececessary to *gain*; this loss of heat is the value of the power gained, just like the escape of water from the buckets of the water wheel. Let a millwright build a wheel so that the inlet water will not be able to escape, and how many revolutions will the wheel make, by thus saving the water? Only one. All machine force, is re-action, the result of action and its equal, and was the doctrine which enabled D'Alembert to make a number of beautiful mathematical discoveries.

If we cover up all this first engine of Capt. Ericsson, with a good nonconducting substance and keep the fire under it, the hot air after a certain length of time, will impart its heat to every portion of the Regenerator, and the pressure of the air will be alike in both cylinders, therefore the engine must stop, for the pressure will be alike on both sides of the pistons. The radiation of the heat therefore, what is called the *loss*, is the real value of the power given out by machinery. The quantity of heat required to produce a certain effect in velocity to air, may well be compared to the quantity of fuel required to make a vessel move through water, in other words, give a certain quantity of water a certain rate of motion; the greater the quantity to be acted upon, the greater the amount of heat, or fuel required.

Thus we have described and philosophised on Capt. Ericsson's first engine, and now in Figs. 2 and 3, we have his engine as improved after 17 years' time to perfect it.

Figures 2 and 3 are longitudinal sections of Ericsson's Hot Air Engine, improved and patented in England 1850, in the United States 1851. We do not wish to occupy space in our columns now with a full description of these figures, we refer to page 60, last Vol., Scientific American, for this, but we re-publish

Figure 2.

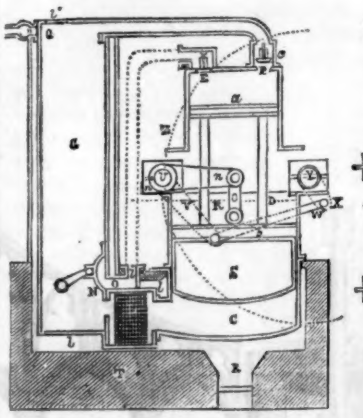
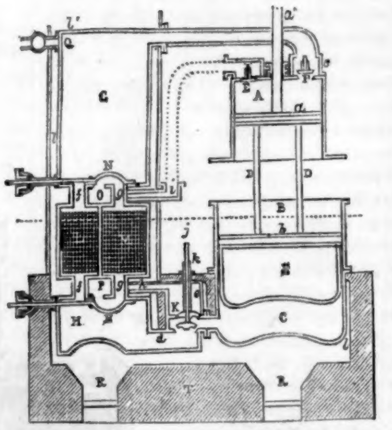


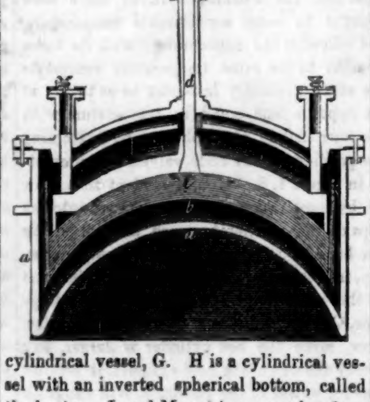
Figure 3.



the engravings to point out the transformations which this caloric engine has undergone, and we trust we shall make its operation and construction clearly understood. We wish particular attention directed to spherical furnaces which are now used by Ericsson, also to the using of the same air over and over again, both in the original engine, and this one of 1850, but not in the one he now employs.

A B are two cylinders of unequal diameter, but nearly alike in all points; *a*, and *b*, are their pistons; A is the supply, and B the working cylinder: *a'* is the piston rod; C is a cylinder with a spherical bottom, called the expansion heater, and is affixed to the working cylinder. D D are braces which connect the pistons, *a b*. E is a self-acting valve opening inwards to the supply cylinder. F is a similar valve, opening outwards from the said cylinder and contained within the valve box, *c*, which is connected by a pipe with a

Fig. 4.



cylindrical vessel, G. H is a cylindrical vessel with an inverted spherical bottom, called the heater. L and M are two vessels of cubical form filled to their utmost capacity (excepting small spaces at the top and bottom), with discs of wire net or straight wires, closely packed, or with other small metallic or mineral substances, such as asbestos, so arranged as to have minute channels running up and down; the vessels L and M are named regenerators.

Operation.—Fire having been kindled in the furnaces, R, and the air chamber heated up, air is forced in by a hand air pump into the receiver until it is about 12 lbs. pressure to the square inch. The conical valve at the lower end of stem, *j*, is then opened, and the air enters under the piston, *b*, which as heat is imparted to the air, ascends, and the air in cylinder A, is forced into the receiver, G, by piston, *a*. Before the piston, *b*, has completed its stroke, the valve of *j*, is closed (this is the cut off); at the end of the stroke, the valve K is opened, and the hot air escapes through the passages, *e h* P and *g*, into the pile of wire gauze or regenerator, M, where it parts with its heat and then passes up the pipe indicated by the dotted lines, and into the upper cylinder through the valve, E, there to be forced out into the receiver, G, by the next up stroke of the piston using the same air over and over again. This was certainly a kind of perpetual motion engine, the same heat and the same air being used over and over again.

Within two years the engine has undergone a change; the same heat but not the same air is repeatedly used. If we suppose the pipe with the dotted lines to be a chimney opening to the atmosphere, and not into the upper cylinder, A, so as to let the spent hot air pass out, we will have the caloric engine as it now is. The cold air is taken from the atmosphere direct into cylinder, A, which is simply a large air feed pump, and compressed into a receiver, and the spent air is sent away into the atmosphere. Figures 2 and 3 are somewhat different, but the principle is the same, the links and crank show how the power is conveyed to drive the shaft of the paddle wheels. If we suppose four of those single acting cylinders to be arranged in line, two on each side of the main shaft, giving it motion by a walking beam, our readers will have a good idea of the engines of the caloric ship.

This hot air engine has been denominated "a new motive power," by nearly all our papers. The "New York Daily Times," and "Hunt's Merchants' Magazine" have specially so termed it. Now we wonder at this, for no person who has received an education at a good seminary or university can be ignorant of the fact that "hot air" is capable in its very nature of moving machinery. It certainly takes away much from the character of any editor for intelligence to have used such language.

Hot air engines are very old. In France, hot air was used prior to steam. The great principle of the Ericsson engine, is the regenerator. "Hunt's Merchants' Magazine" says about the "regenerator":—the wonderful process of the transfer and re-transfer of heat, is a discovery which justly ranks as one of the most remarkable ever made in physical science. Its author, Captain Ericsson, long since ascertained, and upon this is based the sublimest feature of his caloric engine, that atmospheric air and other permanent gases, in passing through a distance of only six inches, in the fiftieth part of a second of time, are capable of acquiring, or parting with, upwards of four hundred degrees of heat. He has been the first to discover this marvellous property of caloric."

Our readers expect of us correct information on this subject, which has not been given elsewhere. We will therefore endeavor to point out what is new and what is not new, in Ericsson's engine. The principle of robbing the escaping hot air of its caloric by passing it through narrow metal plates having small channels in them, and then using this over again, is the invention of the Rev. Dr. Robert Stirling, a Scotch Presbyterian clergyman of Galston, who took out a patent for his hot air engine in 1827. His engine is illustrated and briefly described on pages 667, 8, 9, 10, of Galloway & Hebert's History of the Steam Engine, published in London in 1832, before Capt. Ericsson took out his first patent. It was asked of the author of the "caloric engine," while he was explaining his engines on the trial trip of the caloric ship, if "there was no danger arising from fracturing the top plates of his furnaces by the expansion and contraction of the metal." His answer was, that "owing to the spherical form of his furnaces, the top plates expanded and contracted without danger of fracture." Figure 4 is a vertical section of Dr. Stirling's hot air furnace; it is spherical, and of the form now used in the caloric ship. This figure is taken from the book referred to, page 668. *a a* is the cylinder; *b* is the hot air chamber; C is a piston packed with thin pieces of metal, perforated with zig zag holes, and pieces of brick and other non-conducting substances below. This piston was moved by the rod, *d*, in the hot air chamber, and the cold air passed from the top of the piston, through the small holes, and down into the hot air chamber, and from thence to the working cylinder, which was double acting, and had an air vessel for each end, just as the present caloric engine uses two hot air furnaces for two single acting cylinders which amounts to one double acting one. The same air was used over by Stirling continually. A gentleman in this city, a professor of mathematics and languages, and who is well versed in mechanical inventions, has informed us that Dr. Stirling, while pastor in Kilmarnock, many years before 1827, was to his knowledge blamed by his parishioners, for neglecting his ministerial duties for his hot air hobby. Mr. Steel—called the doctor in this city owing to his extensive acquaintance with science and art—who may be said to be the originator of the New York Mechanics' Institute, exhibited and described a model of Stirling's hot air engine, in his lectures in Glasgow before he came to New York, and that is many years since.

Hebert's history does not give a very clear description of the operation of Stirling's first hot air engine, but we have the words of Dr. Stirling's brother, an engineer of Dundee, Scotland, who was a joint inventor. He, along with his brother, took out a patent for an improvement in 1840, which was described in the "London Times," "London Mechanics' Advocate," Vol. 4, pages 229 and 230, and in the "Dundee Advertiser," Oct. 1841. This latter paper says "it is now working at the Dundee Foundry, is superior to the steam engine, saves a great deal of fuel, and for the purposes of navigation, it is invaluable."—This paper thus states its principle of saving heat:—"Of the heat communicated to the air from the furnaces, a very small portion is lost, for by making *the air, in its way from the hot to the cold end of the air vessel, pass through a chamber divided into a number of small apertures, the great extent of surface with the hot air extracts the heat temporarily, and restores it to the cold again on its passage back from the cold to the hot end of the vessel.*" This paper of 1841 uses the following identical language recently used by some of our papers in reference to the caloric engine. It says again:—"In reference to the purposes of navigation, this invention must lead to extraordinary results, and will render a voyage to India round the Cape, by machinery, a matter of perfectly easy accomplishment."

In 1846, J. Stirling, the engineer, read a paper on Stirling's hot air engine, before the Institution of Civil Engineers, in England. We refer to Vol. 45, page 559, "London Mechanics' Magazine," for an account of the same. The paper elicited a long discussion among such men as Sir George Cayly, Robert Stevenson, C. E., A Gordon, C. E., Smith, of Deanston, J. Jeffreys, &c. Mr. J. Jeffreys said, "the principle of the engine's operation is analogous to that of a respirator. The conducting power of the metals alternately absorb and gives out the caloric." This description is just like that of M. V. Beaumont's, about

the Caloric Engine in the Herald; some gentlemen on board also called it "the breathing ship." Mr. Stirling said, on page 565 and 566, London Mechanics' Magazine. "In an early patent (1827, his first.) he had specified the arrangement of the respirator, intending to use a series of *perforated plates or wire gauze*." This was in print four years before Capt. Ericsson obtained his last patent. We quote fairly, and treat the matter candidly, giving our authorities, so that any person can examine for himself, and see that we set down nothing but truth—truth long known to us, but with which our newspaper editors cannot be supposed to be acquainted,—on that very account they should have been more moderate in their language. So much then for the history of the hot air engine.

We have only to add that it was stated at the aforesaid meeting, that Stirling's hot air engine, of 30 horse power, had been in operation for two and a-half years, driving all the machinery of the Dundee foundry, and that the fuel it consumed was only 2½ lbs. of coal per horse power in an hour.

POWER OF THE ENGINES.—In the Caloric Ship, there are four working cylinders, each having 22,300 square inches of piston area (each single acting) and six feet stroke. The supply cylinders (air feed pumps) have each 14,794 square inches of piston area, and the same length of stroke. The horse-power of the caloric engines is set forth in the following extract from the "New York Herald," which was an answer to a correspondent of the "Brooklyn Eagle," and has been sanctioned by Capt. Ericsson as being correct. "Atmospheric air, enclosed in a tight vessel, and elevated to a temperature of 384 degrees, acquires, it is well know, a pressure of 12 pounds per square inch. This happening to be the working pressure of the engines under consideration, it will be quite easy to test the accuracy of the calculation of the scientific correspondent, by estimating the force of the working piston, and the resistance of the supply piston, each by itself. The latter deducted from the former will obviously exhibit the theoretical power of the engine. Now, each working piston of the Ericsson contains 22,300 square inches, operated upon by heated air of 10·96 pounds, mean pressure—the actual pressure of 12 pounds being reduced by cutting off at three-fourths of the stroke. The mean force of the working piston will thus be 22,300×10 96=244,408 pounds. The active space passed through by the four working pistons being 6×14×4=336 feet per minute, the active power developed will be 244,408×336=82,121,128÷33 000=246·88 horse power. The supply pistons, each containing 14,794 square inches, in compressing and forcing the cold air into the receivers, operate against a mean resistance of 9·34 pounds per square inch. The contracting force of these pistons will thus be 14,794 × 9·34×336=46,527,936÷33,000=1,409 horse-power, which deducted from 2488, leaves 1079 horse-power differential or effective force, losses by friction, &c., being disregarded. Make the liberal allowance of 479 horse-power for such losses, and 600 horse-power remains—a force sufficient to effect far more than the projectors of the Ericsson expect. Some time may yet elapse, it is reasonable to suppose, before the pistons, valves, &c., will be rendered air-tight enough to retain the internal pressure of the machine, which is so essential in bringing out its full power. ENGINEER."

There were many typographical errors in the Herald,"—we have corrected some of them so as to state the question as fairly, as viewed by those interested in the "Caloric Ship."

The above calculation however is not correct and we will endeavor to point out more than one error. We allow the 384° to be above the common temperature of the air, which if it is 40°+384°=424° it will not have a pressure of 12lbs on the square inch, but 11.731lbs. Air doubles its volume by an increase of its temperature to 491° according to the latest experiments of Regnault and Magnus, not 480° as Capt. Ericsson calculates, therefore when air is heated from 40° to 531° it will exert a pressure of 15lbs on the square inch thus 491°÷15=32·733, therefore 384÷32·733=11·731lbs. pressure on the square inch, not 12lbs.

The horse power of an engine, is equal to the average pressure on the piston in pounds per square inch multiplied into the velocity of the piston per minute, divided by 33,000. The calculation of Engineer, is not therefore correct, for the air feed pump only allows a certain quantity of air every stroke, and no more; it is not like the steam engine, having a reservoir of power in the boiler; for the pressure of the steam is as the quantity, and so it is with hot air. The pressure then of the hot air in the working cylinder, is not 12 lbs. nor 11·731 lbs., but about 7¾ lbs. on each square inch. The large cylinder, although it has 22,300 square inches area, surely cannot be filled with more air each stroke than the capacity of the feed cylinder, it it were, it must be fed in by some hidden *extraneous steam engine*. Well as 384° of heat is imparted to the quantity of air fed in by the feed pump, we will have a pressure equal to 11.731 upon each square inch of 14,794 piston area, but even allowing the pressure to the 12lbs. on the square inch, the average pressure on the working cylinder will be 14,794×12÷22,300=7.956 pressure on the square inch of the working piston, it has 312 ft. 670 in. of greater cubic capacity; for as is the difference of capacity in the feed pump and working cylinders, so, is the pressure reduced by the expanding. The power of the engines are as follows: 22,350×7.95×54÷33,000=290×4=1160, for the power of the four cylinders. We give 54 ft. per minute as the velocity of the piston, or 9 revolutions of the shaft per minute, as we counted them on the trial trip. Now what power do the engines expend in working the pumps; namely an average pressure of 9.34lbs on the square inch of 14,974 inches area of piston, therefore 14,974×9.34×54÷33,000=228.857 h.-p.×4=915.428—1160 h. p.=244.572 or nearly 250 horse power which the engines have to spare to drive the paddle wheels. We make no allowance for the cut off, for the feed is entirely different from the steam engine; it is forced in, and the quantity of air fed in is the only data for calculation along with the heat imparted.

The power required to feed must be very great, for as the molecules of cold air expand while passing through the Regenerator they exert a back pressure in proportion to the heat they imbibe. What then is the value of the Hot Air engine in comparison with the steam engine? It is in its very nature, owing to the element it employs (hot air) very inferior. Its motion must be sluggish for at every stroke, 616 cubic feet of cold air must be heated to 384° and the faster cold air is passed over a heated surface, the slower it takes up heat.

In the steam engine, for every 1728 cubic feet of steam, it only requires one cubic foot of cold water fed into the boiler. The Caloric Engine consumes nearly all the fuel used upon itself; it is not so with the steam engine. It has been stated that the Caloric Engine only consumes 1 lb. of coal per horse-power per hour; its speed was no more than seven miles per hour by the Coast Survey measurement; therefore, to double its speed, it would consume eight times more fuel, as calculated by engineers, this is half a pound more per horse-power than the Arctic uses, which has made 18 miles per hour in smooth water.

It is said to be more safe than the Marine Steam Engine; but when did we ever hear of a *steam ship* using low pressure steam, bursting her boiler. The steam engine is a safe machine, under the charge of good men, and so is a ship without steam or hot air, but not otherwise.

We would welcome hot air, as a superior and more economical motive power to steam, if it really were so, but it is not. The same amount of fuel applied to a boiler to produce steam from water, will produce a greater mechanical effect than if applied to air, which is a very bad conductor, and absorbs heat so slowly that it must always be sluggish in its motion. A steam engine can be built—boilers and all, which will give out triple the power of the Caloric Engines to the main shaft, and occupy less room. The combustion of fuel in the Caloric Ship is very perfect, and deserves credit, but the amount of leakage must be very great every stroke, as a portion of the fed air must always be lost, and it will be very difficult to keep the pistons air-tight. We therefore cannot have any other belief than that the "Caloric Ship Ericsson" will not be successful.

We have used no scoffing language, nor have we such a spirit towards this enterprise.

In speaking of the fuel, we have allowed 6 tons of coal per day for the Ericsson, with 600 horse-power engines. We have nothing to add to the remarks we published on page 141.

Machinery and Tools as they are.—Geared Wheels.

(Continued from page 147.)

No branch of machinery, probably, has received more valuable assistance from mathematical science than that which formerly was known more especially as "Mill-work," but which is now generally designated by the title that forms the heading of this article. What were the uncouth and almost ludicrous-shaped wheels of the past race of millwrights may be conceived on inspecting the mechanical works of the last century. While the beautiful symmetry of their construction as at present made, is well known to all who are in any way employed about machinery. Not that the machinists of past times were less ingenious than their successors, but they worked mostly at random, unaided by the light of science, whose followers, at that period, spurned for the most part, the researches of any knowledge that could not, strictly, be classed under pure mathematics. A more liberal and enlightened spirit, however, has at length prevailed, and many of the most illustrious disciples of Newton have since, like him, been practical philosophers. More especially with regard to geared wheels have their studies been found of inestimable advantage to mechanics, as all can testify who have heard of Professor Willis, or who have availed themselves of his theory for the construction of toothed wheels. But, as the study of theories is often neglected, and the theory itself sometimes too intricate for the hasty seeker of information, we will here mention that the practical application of the above is to be found in a scale termed the "Odontograph," and which is extensively employed by machinists.

Before entering upon the shape of the teeth, it is worth while to enquire what are the mechanical laws affecting systems of geared wheels, which, if traced to their simple origin, are found in reality to be only a form of the compound lever, and that the conditions of equilibrium are the same. From the fact that the arms of wheels are as levers fixed at one end, and loaded at the other, and that, consequently, the greatest strain is upon that part of the arm next the axle, is derived the mode forming the arms strongest at the axle and tapering towards the rim.

In order that the power applied through the intervention of gearing may be used with the greatest effect, it is necessary that the wheel-work be properly designed and executed, otherwise power is expended to no purpose, and it should be especially noted that the primary object aimed at in the construction of toothed gear is the uniform transmission of the power, supposing that to be constant and equal. This implies that the one wheel ought to conduct the other, as if they simply touch ed in the plane passing through both their centres,—these considerations will show the importance of a right form of tooth for the wheels. Of the various methods which have been employed to determine the forms of teeth, that which is termed the epicycloidal curve, has been an especial favorite. This shape is produced by rolling a circle equal in diameter to the radius of the pinion upon another circle equal in diameter to the radius of the wheel, the diameters being taken at the pitch lines, which are the circles described by the wheel and pinion at their point of contact, the curves so struck, commencing at the pitch lines, form the points of the teeth. They are struck in opposite directions, the space between their starting points being the thickness of the tooth; and from these two points radial lines are drawn to the centres of the wheel and pinion, which forms the sides of the teeth included between them, within the pitch line. This form, it will be observed, made the tooth smallest at the root by the convergence of the radial lines, and consequently tended to weaken it; this was remedied in the pinion by casting a plate upon the teeth, which, forming part of them, served not only to bind, as it were, all the teeth together, but to strengthen the body of the pinion, perforated and weakened by the axle passing through it. "The roots of the teeth" upon the wheel were strengthened by small angle pieces, for which space was found without the curved line described by the teeth of the pinion. Such teeth worked freely and equably together. But it will be observed that the side of each tooth of the wheel consisted partly of a radial line, partly of an epicycloidal curve, and partly of such a concave angle piece as might be found to clear the pinion: and it will also be observed that the wheel and pinion were adapted to each other; consequently another pinion, differing much in diameter from the first, would not act well with the same wheel. A mode of forming the teeth of wheels, by which this inconvenience is obviated, has been proposed by Professor Willis, and the form of tooth thus produced is much superior to the old-fashioned plan. If for a set of wheels of the same pitch a constant-describing circle be taken to trace those parts of the teeth which project beyond each pitch line, by rolling on the exterior circumference, and those parts which be within it, by rolling on the interior circumference, then any two wheels of the set will work correctly together. The describing or "Pitch Circle" should be equal in diameter to the *radius* of the smallest pinion, which, in this case should not have less than twelve teeth. When rolled upon the interior circumference of a circle equal in diameter to the pinion, a point upon the periphery of the pitch circle will describe radial lines through the centre of the larger circle representing the pinion, which is twice the diameter, so that the form of the pinion teeth within the pitch line may be at once drawn in straight lines from the centre. When rolled on the exterior circumference, epicycloidal curves, forming the teeth of the pinion beyond the pitch line are described by the tracing point. But when these operations are performed by rolling the pitch circle upon another of much larger diameter, representing the wheel, the interior and exterior epicycloids form a tooth of very different shape; it is no longer contained within radial lines, but spreads out at the root, giving great strength and firmness at the point, where they are most needed. The exterior epicycloid forms the point of the tooth in a manner similar to that already described; but any wheel or pinion having teeth described by a common pitch circle will work together; even the teeth of a rack, which, being placed upon a straight line, may be regarded as the segment of a wheel of infinite radius can be formed in the same manner, and will work equally well with the wheels. The principles above discussed are applicable to both spur and bevel wheels; there is, however, another form in which teeth are shaped when the wheel and tangent screw principle is employed, and the thread of a cylindrical screw gives motion to a wheel, a plan which is often employed to diminish a high velocity.

(To be Continued.)

Long Tunnel.

One of the tunnels on the Pennsylvania Railroad now constructing, is to be 3,670 feet in length. Its area at the widest space within the lines of the masonry will be about 24 feet, and the spring of the arch will begin 16 feet from the crown of the arch. The arch itself, of the tunnel, will be rather of an oval form, one of the most beautiful curvatures which Conic Sections can afford. The greater part of the vast arched excavation will be inlaid with strong and substantial masonry. More than half of this masonry will be composed of sandstone well laid in hydraulic cement; and the remainder will be hard burnt brick. This whole masonry will be 22 inches thick.

The tunnel passes the Allegheny Mountain in Sugar Run Gap, and lies partly in Blair and partly in Cambria County. Taking into account the length of the Tunnel and its interior breadth, and the quantity and solidity of its masonry, it may be regarded as the largest work of the kind in the United States.—About 400 men are employed upon it.

The Seminole Indians have again entered into hostilities against the United Sttaes.

NEW INVENTIONS.

Improved Rotary Pump.

An improvement on the rotary pump has been lately invented by John Laing, of Brooklyn, N. Y., who has taken measures to secure a patent. In this improved pump the piston is made to work in a recess or slot let into the circular head on the top of the shaft, the circular head being placed eccentric with the bore of the cylinder, which is fashioned of a slightly elliptical form. By this arrangement the length of the piston does not require to be varied, which would be the case if the bore of the cylinder was made circular. In order that the pump may draw as soon as it is worked, a reservoir or water chamber is placed beside it, with which the supply and feed pipes communicate. The piston, as it rotates, forms a vacuum in the lower part of the cylinder when the water rushes in through the supply pipe, which is separated from the discharge pipe by means of the circular head on one side of the cylinder, and the action of the piston bearing against it on the other. The end of the piston, when it passes the orifice of the supply pipe, forces the water around the cylinder into the discharge pipe, and when it has passed this latter, the other end of the piston goes through a similar operation, which is performed alternately by either end as the piston rotates.

Hydraulic Ram.

Joseph C. Strode, of East Bradford, Pa., has taken measures to secure a patent for improvements in the above. The inventor forms the driving pipe of a peculiar shape, as it describes such a course that it enables a greater quantity of water to be raised by a machine of a given size than can be raised with a driving pipe formed in any other manner. It will moreover, cause a greater re-action of the water to take place after the closing of the valves leading to the air-chamber, and thus more perfectly ensure the opening of the discharge valve. Besides this improvement, there is an arrangement for regulating the closing of the discharge valve, so as to prevent the violent shock which it experiences each time it closes. This is remedied by causing the part of the valve below the seat, to enter a recess, and thus make a very narrow space between the valve and recess, a similar space is obtained above the valve, so that the gradually contracted escape of the water is made to break the force of the shock, and provision is also made for retaining a little water above the valve, to prevent a vacuum being maintained between the valve and its seat.

Improved Auger.

Measures to secure a patent for an improvement in augers and bits have been taken by Charles P. Crossman and Levi T. Richardson, of Fitchburg, Mass. The chief difficulty attending the use of the ordinary augers is their liability to choke with shavings as they work out of the spiral recess, and consequently to wedge as the auger is turned between the edges of the spiral thread and the sides of the hole. The above improved tool is completely free from this defect, in addition to its great merit as a cutting instrument as will be perceived by a short description. The cutting parts project at right angles from the center screw and are formed with curved edges, so that the auger cuts rapidly, and yet requires but little power, because the curved form gives it a drawing cut. The shavings are compelled to keep within the spiral recess, as there is a lip projection at the end of one of the cutting edges.

Connecting Hubs and Axles.

A new method of securing carriage wheels on to their axles has been invented by Guy Davis, of Syracuse, N. Y., who has taken measures to secure a patent. It consists in fitting two springs having catches at their ends around the inner circumference of the rimer end of the axle box, which, where the wheel is placed on, is made tight by means of a dove-tail wedge driven into the hub. The grooves for receiving the springs are made of a suitable depth to allow of their being pressed down, for the purpose of disconnecting the catches from the axle, when the wheels are required to be taken off or put on. By this method of securing the wheels on the axle, no screws are required, so that they can be put on or removed with the utmost dispatch. It is likewise very cheap.

Hearson's Water Gauge for Boilers.

The annexed engravings are views of a Water Gauge for steam boilers, constructed by John Hearson, of New York City, who has taken measures to secure a patent for his improvement.

FIG. 1

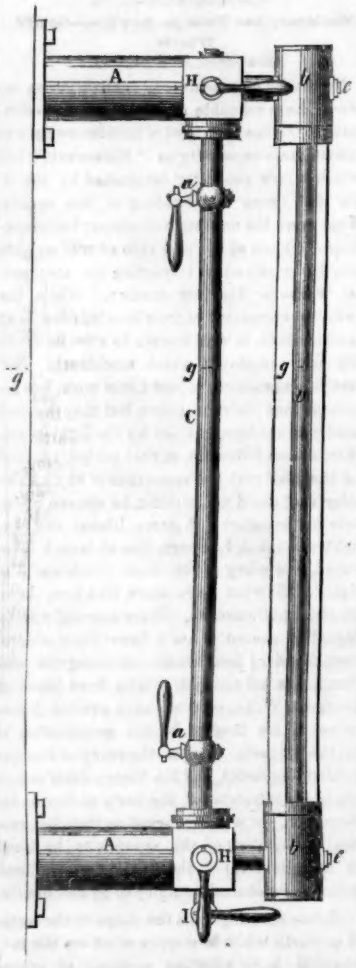
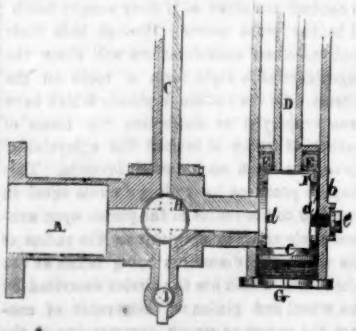


Fig. 1 is a view of the gauge, and fig. 2 is a vertical section of the lower part of it. The same letters of reference indicate like parts, One vertical tube is made of metal, and the other of glass, and they are connected to the boiler by proper pipes. The metal tube has try cocks inserted in it, and the height of the water in the boiler is indicated by the height of the water in the glass tube. The ends of the glass tube are packed in a peculiar manner, by which the escape of water around them is prevented.

A A are the pipes, which are attached to any project horizontally from the boiler. These pipes are connected by the upright tubes, C D. The ends of tube C may be connected to the pipes, A A, in any proper manner. This tube, C, is made of metal, and has two try-cocks, *a a* inserted in it. The tube

FIG. 2.



D, is made of glass, its ends are inserted in sockets, *b b*, at the ends of the pipes, A A. These sockets are somewhat larger in diameter than the glass tube, as seen in fig. 2, to allow the spaces between the outside of the tube and the inside of the sockets to be packed with vulcanized india rubber packing, E E. A hollow cylinder, F, fits within the socket, and may be tightened against the india rubber by means of the nut, G, which screws into the end of the socket, and bears against a head, *c*, in one end of the cylinder. It will readily be seen that, by screwing up the nut, G, it will press upon the india rubber and cause it to expand laterally, and make it fit tightly around the tube, D, and against the inner surface of the socket, *b*. The cylinder, F, has two oblong apertures, *d d'*, through its sides at opposite points. The aperture, *d*, allows the water to pass into it, and then up the glass tube. The aperture, *d'*, receives a nut, *e*, which prevents the cylinder from turning within the socket. The nut, *e*, also serves as a blow-off cock. Both sockets of the glass tubes are alike. H H are stop cocks placed in the pipes, A A, for the purpose of preventing the entrance of water into the tubes when desired; I is a blow-off cock placed in the under side of the lower pipe, A. The dotted line, *g*, indicates the height of the water in the boiler and the tubes. By this gauge, the placing of the try cocks in the boiler is avoided, and by arranging the two tubes as described an accurate water height gauge is obtained. The try cocks and blow-off cocks keep the tubes clear. The arrangement of the tubes, and their combination it is believed, will enable this gauge to exhibit the correct water level in the boiler, and not be affected by foam, &c.

More information may be obtained by letter addressed to Mr. Hearson at No. 13 South William street, this city.

Improved Horse-Power.

Measures to secure a patent for improvements in the above have been taken by P. G. Gardiner, of New York City. By this improvement the horse-power can be readily adjusted to drive any machinery, although it should be fixed in such a position as to render the ordinary arrangements useless. By causing to be adjustable the belt pulley, which transmits the force from the motive power to the machinery, the above-mentioned difficulty is surmounted, for the pulley can be turned and brought in line with the driving pulley of any machine, however inconveniently the latter may be situated. The plan adopted is briefly this, the shaft which carries the adjustable pulley rests in bearings fixed to a collar, which moves loosely around a socket, but can be held fast in any desired position by set screws.

Packing Goods in Boxes.

The great difficulty hitherto attendant on pressing goods in boxes, consists in the parting of the sides and bottom of the box under the pressure of the screw. To obviate this disadvantage, an improved method has been invented by J. E. Earle, Esq., of New York, who has taken measures to secure a patent. For this purpose two clamps are employed, which secure the bottom and likewise the sides of the box from the pressure of the screw-bed and follower. These latter are slotted, so that the clamps can pass through, and in like manner the clamps have apertures for fixing a couple of pins, against which the screw-bed bears when the screw is turned for forcing down the follower.

Securing Hubs to Axles.

An improved mode of attaching hubs to axles has been invented by William McBride, of Bristolville, Ohio. The above purpose is effected by using two clamps or jaws, each having a semicircular recess in the middle, which, when closed, form a circular opening, through which the arm of the axle is passed and secured tight in the hub. The clamps or jaws are opened or spread apart, so as to allow the hub to be attached to or detached from the axle by means of an oblong stud fixed to the end of a rod, which passes longitudinally through the hub, and is operated upon at the other end by a key. The stud, when the clamps or jaws are closed, is in a vertical position, and fits between the semicircular recesses already mentioned, so that when the stud is turned around, it forces the clamps apart, and consequently the opening formed by the recesses is made sufficiently large to allow the end of the axle to pass through.

Webster's Unabridged Dictionary.

By Governor Seymour's Message we learn that 8,500 copies of this great Dictionary were purchased last year for the use of School Districts in this State.

The Morse Telegraph---Its Principle.

A correspondent of the "Tribune" states that the operators of the telegraph running between Buffalo and Milwaukee, working under Morse's patent, have for some time past discontinued the practice of recording the signs, and have instead thereof received their messages by sound. This they have done for the last two years, without interruption, having found that they could receive three messages by sound in the same time which would be occupied in receiving two under the other system; and moreover, that in receiving by sound they make fewer mistakes than they were liable to in the use of the dots and dashes, and can also dispense with half the number of operators.

The mode of receiving messages by sound is very simple, and one operator is sufficient instead of two, who are required when the signs are recorded. The operator sits by the table in any part of the room where the message is received, and writes it down as the sounds are produced. The different sounds are made by the striking of the pen lever upon a piece of brass; thus three raps in rapid succession are made for the letter A, two raps, an interval, and then two raps more are made for B, and so forth.

We cannot see how fewer operators are required, or less mistakes made by sounds than by marks, and we question the correctness of the statement. Our object, however, in alluding to this subject at this time, is to point out the real genuine principle of Morse's invention. It consists in employing an *electro-magnet*, to make marks, or by its vibrations in any manner to convey the messages. It makes no matter whether it conveys those messages by sounds or by marks, in any telegraph which uses an *electro-magnet* operated by breaking and closing the circuit, the electro-magnet proclaiming the message by raps as spoken of above, or by making marks, embraces Morse's principle. According to Judge Kane's decision, the recording of the messages was the new art embraced in Morse's patent. The recording and the sounding of messages are only the effects produced by Morse's invention, not the invention itself, We give the principle of the invention its true meaning as explained by Prof. Morse himself, in Alfred Vail's work, entitled "The American Telegraph."

Wire Suspension Bridge.

A report has been recently received by the Corporation of Georgetown, D. C., from the distinguished engineer, Charles Ellet, Jr., Esq., on the much-talked-of scheme of a bridge across the Potomac near that town, at a spot called the Three Sisters, about half a mile west of the aqueduct. The bridge Mr. Ellet proposes is a wire suspension bridge, of such size and weight as to be competent to the uses of railroad as well as ordinary travel. At the preferred point, at the Three Sisters, the river is 1,030 feet wide, which would be the length of a bridge there. This distance Mr. Ellet proposes to span with a single arch, declining to use the granite rocks which lie in the river in the line of the proposed structure.

The cost of this structure he sets down at $297 870, but says that if the bridge be divided into two spans by a pier on the aforesaid rocks, the cost would be only $240,000. He prefers the sigle span, however, on account of its handsomer appearance. This bridge, he states, would be four times heavier and stouter, and therefore four times stronger, than the Wheeling suspension bridge (of which Mr. Ellet was constructor,) and would more than sustain the simultaneous pressure or weight of two locomotive engines with their tenders, forty loaded freight cars, one hundred loaded carts on the carriage-ways, and one hundred horses, enough to occupy the bridge from end to end, and in all amounting to six hundred tons weight.

Iron Furnaces.

The "Baltimore Sun" gives a list of thirty-one blast furnaces, all these are in Maryland of which it says that most of them have been idle during the late depression and excessive importation; but, prices having greatly improved, these works are now about going into blast again. Their aggregate capacity is seventy thousand and five hundred tons.

Scientific American

NEW-YORK, JANUARY 29, 1853.

Mechanics and Industrial Education.

A convention was recently held in the city of Albany for the purpose of forwarding measures to the establishment and endowment of a college in this State, where young men will receive a profound education, and be taught practical mechanics. An association for this purpose, of which D. C. McCullum Esq., architect, an excellent man, is President, has been in existence for some time. The objects of the association are good; we like them, and we hope to see them carried out fully and fairly by the contributions of the mechanics of the State of New York, independent of all political patronage. At the said convention, W. Deering, of Albany, stated that the operatives belonging to the manufacturing establishment to which he belonged, had set in operation a plan for raising funds to establish the People's College. The plan is for each operative to pay in six cents per week as an endowment fund. This is commencing the work in the only rational and proper manner to ensure success. If all our mechanics throughout the State would go into this scheme heart and hand for one year, they would raise a handsome fund indeed. There are no less than 200,000 mechanics in this State, and if each one could pay six cents per week into this fund, it would amount to $12,000 per week, or $624,000 in a year. If one-half of this number would thus contribute (a number which we think are able to contribute), they would in one year establish the strongest college in this State. But will they do it? that is the question. This project originated with the "Mechanics' Mutual Protection," an order which at one time promised to to be exceedingly useful and beneficial to manufacturers and mechanics. Its objects were to cultivate a good feeling between them, and to advance knowledge and skill in the arts. Many of the best mechanics in this State joined it, and hailed its rise as the dawning of a brighter day. It prospered for a few years, and has still a weak existence. It might have been prosperous and strong now had not some political enthusiasts endeavored to make it subservient to party purposes. It has done some good however, and it may rise again, and become wise and beneficial.

With respect to Industrial Colleges, some foreign countries are far in advance ot us, but not so in Britain, for there are no such institutions in that kingdom. On the continent ot Europe, however, they have been in existence for a long period, and have always been advancing in usefulness. In many of the German States, institutions for industrial instruction are in a highly efficient state. The pupils reared in them are in constant demand, and are esteemed above all others. In the Trade Schools and Polytechnic Institutions of Germany, it is estimated that 13,000 men annually receive a technical and scientific training; and in schools attended by the working classes during their leisure hours, upwards of 20,000 operatives are systematically studying the elements of science and art. In the capitals of the German States there are central institutions of the nature of industrial universities, the object of which is to teach the principles of science and art applicable to production, preparatory to their being afterwards practically followed out in the operations of the factory and the workshop. The importance of these technical colleges is recognized by even the smallest of the German States, which support them at considerable expense. In the institution at Carlsruhe (Baden) with its museums, laboratories, and workshops, there are 330 pupils, whose training is superintended by 21 professors and teachers. The Central School of Arts and Manufactures in Paris annually educates 300 pupils in applied science and art, and exhibitions in connection with it exist in 29 departments, for the instruction of poor but meritorious artisans in the provinces. The pupils of this school readily find employment on leaving it, and 500 of them are known to be holding posts of importance in various parts of the world.

No country in the world has progressed so rapidly in the knowledge and skill of the industrial arts as these United States within the past 20 years. Every machinist knows what great improvements have been made in tools and all kinds of machines. We are not marching forward merely, but running a race for the character of "the master mechanics of the world." With the establishment of Industrial Colleges in every state, the time will soon arrive when this character will be ours.

Miller's Evaporator.

The annexed engravings are views of an evaporator for marine steam boilers, to supply any deficit of pure water by the surface condenser of James. M. Miller, of this city. The condenser was illustrated and described on page 17, this volume, Scientific American, and our readers will acquire a perfect understanding of the whole subject by consulting the said description in connection with this one.

Figure 1 is an outside view of the evaporator, and figure 2 is an interior view—a vertical section of figure 1 taken, through the dotted lines, D C. The same letters refer to like parts.

This evaporator is simply a distilling apparatus, constructed with tubes of the same kind as that used for the condenser, and is merely to distil from salt water any deficiency of the fresh condensed water for the boilers. Very little will be required, but it is best to have appliances to meet every emergency. Salt

Figure 1.

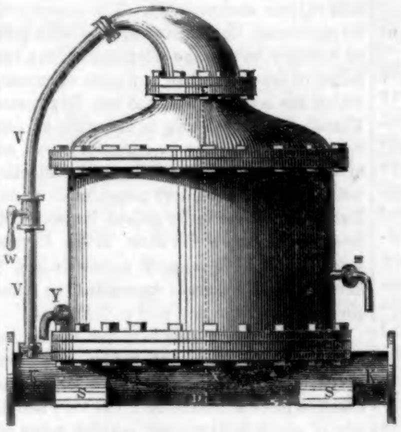
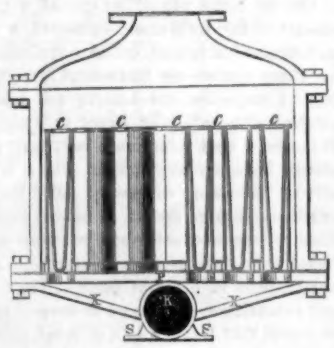


Figure 2.



water is introduced inside by forcing it by a pump through the pipe, Z, which can be washed out, when saturated, by the pipe, Y. This apparatus is placed nearer to the boiler than the *heater*, represented on the page referred to above. K K is the pipe which connects the exhaust pipe of the steam engine with the condenser. The vessel being filled with salt water, the steam of the exhaust passes up into the pipes, C C, figure 2, from the pipe, K, which is open inside to allow this. Two of the tubes are represented in full. Allowing the salt water to be cold, when the steam is first let in, condensation of the steam will take place for a short time, but it will flow onwards to the condenser. When the salt water is heated to steam heat, moderate evaporation will take place, and the vapor will pass up and then down the pipe, V, into the condenser; W is a cock to open or close communication with the vaporization chamber; S S are flanges to support the apparatus and bolt it on a suitable bed-plate; X X are side flanges which perform the office of braces; P is the bottom plate. All the outside parts are of cast-iron, and are made strong and durable. Water gives off some vapor, at a lower temperature than 212° as can be noticed in any boiler or during solar influence. A small apparatus of this kind, used perhaps once or twice on a voyage across the Atlantic, it is believed will be sufficient to make up any slight loss of condensed steam, to be used over and over again for the boilers, and thus meet any loss.

The surtace condenser was the first which was tried by Watt, but he found so many difficulties connected with it, that he early abandoned it for the *jet* condenser, which allows the condensed water to flow away along with the injection. A good surface condenser for steamships is certainly a very desirable apparatus. The use of fresh water for the boilers instead of salt, which is now used, would save at least one-fourth of the fuel, and would in respect to its action upon the boiler, enable one to endure twice as long. Tubular boilers, owing to incrustations being so liable to form in the necks of the tubes, have always been objectionable for using salt water, although otherwise they are by far the most economical as steam generators. A good surface condenser whereby they might be fed over and over again with pure fresh water, is just what is required for them.

We are well aware that many surface condensers have been tried and laid aside, owing to the unequal expansion and contraction ot the metals of which they were composed.—On our advertising page will be found the advertisement of Cobb, Mason, & Hill, of North Point Foundry and Machine Works, Jersey City, who have used the condenser for more than a year, and who will warrant them against fracture by the expansion and contraction of metal.

Stoves, Something Wanted.

There are perhaps one hundred stoves made in these United States, for one in any other country of an equal number of inhabitants. There is an old saying, "practice is perfection," which should be true, but *common sayings* are not always truthful ones, for assuredly we are far from having arrived at perfection in the manufacturing of stoves. We are not in possession of the statistics of the stove trade, but we have no doubt that it is one of the most extensive and prosperous in our country.—With all our extensive practice, where is there a stove to be found that has not some glaring defects. Our parlor stoves are destitute of tasteful and chaste ornament. The great majority of them seem to be designed upon the principles of elaborate and coarse flowered surfaces, as if these constituted the soul and body of stove beauty. While we are writing this, a parlor stove before us exposes a most inordinate amount of carved work, which the designer no doubt thought would immortalize his name among the craft, or make his fortune. If he had left off all his flowers and devoted his attention to the form of the stove, he would have done more for his own credit and that of our country. Stove designers seem to be smitten with the idea that combinations of flowers, scrolls, &c., constitute the very perfection of their art. Do the flowers of sculpture and architecture constitute the highest degrees of these arts? No, they are to the statute and temple what binding and lace are to a coat, they cannot make it look graceful or pleasing to the eye if it is of a bungling form. More attention should be devoted to the general form of parlor stoves; the French display much taste in the few stoves which they make.

We have never seen a stove of a perfectly convenient construction for domestic use, especially in the cleaning out arrangement, and for kindling the fire. Cylinder stoves, although very neat and excellent in their way, are exceedingly inconvenient for cleaning out. The fire of all stoves should be so placed with reference to the door, that it can be cleaned out with a shovel. Now, no stove that we are acquainted with is thus conveniently constructed. A common stove, after being kindled, when it fails to ignite the coal, is very troublesome to clean out and re-charge again. The cylinder stove has no convenience in arranging for kindling with wood and charcoal. We are speaking of coal stoves, those made for burning wood are convenient enough in this respect.

For cleaning out the oven—the low oven of a stove—it would be very easy to cast the back plate with an opening to be covered with a slide plate running in between side grooves like the lid of a box, this plate could be removed, and at any moment a small hoe might be introduced without any trouble to draw out the dust and soot, and thus keep the flues always clean. The patents for stoves are very numerous, but the right kind of stove has yet to be invented.

Paine's Patent for Ventilating Cars.

A correspondent enquires of us if it is true "that H. M. Paine's patent for railroad cars has been overthrown by H. B. Goodyear, the assignee of E. Hamilton, on a case brought before the present Commissioner of Patents."

We would state for the benefit of our correspondent, and perhaps many others, that H. B. Goodyear has published advertisements setting forth that in the case of an "appeal" or matter of "interference" between Henry M. Paine and H. B. Goodyear, assignee of E. Hamilton, priority of invention was decided in favor of Hamilton as the inventor. H. B. Goodyear gives information to all the railroad companies (and especially the "New York Car Ventilating Company,") who have derived licences from Paine, that unless settlement is made within a reasonable time they will be sued for violation of the patent.

On December 18th, 1852, the Commissioner, of Patents, S. H. Hodges, Esq., decided that E. Hamilton was the first inventor of the improvement for ventilating railroad cars, by the arrangement of *vertical blinds or shutters* adjusted to act as deflecting panes.

This decision may not be final. An appeal can be carried to the Assistant Judge of the District of Columbia, and from him to the District Court of the United States here (N. Y.) There is something about the business which we have not yet been able to dig out. H. M. Paine received a patent on the 6th of January 1852, the decision of the Commissioner of Patents cannot overturn that patent. A Judical Court has the power to declare *it void* and of none effect, and no other. What may come out of this case we do not know; the Commissioner of Patents made the decision upon the evidence presented to him, but that is all, it does not settle the matter by any means.

British Patents for Colonies.

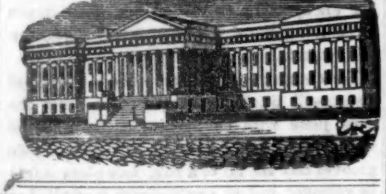
Since we penned the article last week about Patents for the Colonies of Britain, we have received a letter from a correspondent, who states that the British Government has no right nor business to grant patents for Colonies, which have obtained Legislatorial authority; "consequently," he says, "all the money that has been received for such purposes, by said Government, was obtained under false pretences." This is strong language. He also asserts that "an American can import a patented article into Canada, in defiance of all the patents there which are granted only to residents and citizens." We affirm that it is the duty of the British Government to provide a means for foreigners obtaining patents in the colonies, since they cannot obtain such privileges by Colonial authority.

Another New Motive Power.

In the "New York Tribune" of Saturday last, Darius Davison publishes a long advertisement about some new motive power which he has discovered, that is to save 90 per cent. of fuel. One such Power is enough at once; we hope he will bring it out soon, so as to give the public a view of it. We are prepared for the "Wooly Horse" whenever he makes his debut. Those sea captains who trust to good sails save 100 per cent. of fuel; Mr. Davison is theretore ten per cent. behind the old sea marks yet. The next discovery may be a power to make two pounds of coal for one used.

The Clock Lamp.

A correspondent informs us that Robert Wicks, formerly of Williamsburgh, now of this city, invented a Clock Lamp seven years ago, which was like that recently patented in England by E. Whele.



Reported Officially for the Scientific American

LIST OF PATENT CLAIMS

Issued from the United States Patent Office

FOR THE WEEK ENDING JANUARY 18, 1853.

TREADLES OF LOOMS—By Robert W. Andrews, of Stafford, Conn.: I claim operating each treadle, by means of a mover, having two outwardly acting cam surfaces of unequal lengths, combined in one piece, and producing the movements and retentions, substantially set forth.

I also claim such a form and arrangement, respectively, of the treadles, as can be reversed in their positions upon their fulcrums, and thereby cause a reversal of the movement and retentions of the said treadles, as set forth.

BEDSTEAD FASTENINGS—By Chas. L. Bander, of Cleveland, Ohio: I claim the fastening of bedsteads by the use of a metal bar, having upon its extremities, arms, with inner faces, formed of sections of screws, which arms work against the faces of castings secured in the bed posts, and to the ends of the rails, thus drawing the ends of the rails against the posts; the facings of these castings, against which the arms of the bar work, being likewise constructed of sections of screws, the joint being kept close, and the bedstead firm, by the pressure of the slat frame, caused by the weight of the bed, and its occupants, upon arms attached to the metal bar, thus forming a self tightening fastening, the whole being constructed and arranged as set forth.

MACHINERY FOR REDUCING METAL BARS—By D. H. Chamberlain (assignor to C. G. Howard), of Boston, Mass.: I claim the combination of the bolster, with the three rollers, as arranged and made to operate together, substantially as specified, the object of the said bolster being to prevent the over-riding or squeezing out of the metal, so as to form a fin between the rollers.

SADDLE TREES—By Jos. Contner, of Milroy, Pa.: I claim connecting the bridge spring seat to the pommel of the saddle, by hooking or fastening the hook or curvature, on the front end of the longitudinal centre spring of the bridge spring seat, to the semi-oval or semi-circular steel or iron-plate or strap, fastened down, underneath the pommel, by screws or otherwise, through its legs to the legs of the pommel, to give additional spring or play, by its motion on its pivots, to the seat, and to allow the bridge spring seat to be disconnected from the frame of the saddle, when necessary, and to strengthen the pommel by rendering the hole through it, near the horn (which weakens it), for connecting with the seat, unnecessary.

DRIVING CIRCULAR SAWS, &c.—By George & David Cook, of New Haven, Conn.: We claim the curved or hooked tooth pinion acting in the manner set forth.

HARNESS BOARDS FOR JACQUARD LOOMS—By Edward Everett, of Lawrence, Mass., and S. T. Thomas of Lowell, Mass.: We claim the sectional harness board, in combination with the movable supporting bars, placed on each side of the frame, for the purpose of adjusting and retaining said harness boards, in the position required; the whole constructed, combined and arranged as specified.

WOOL CONDENSERS—By James S. Hogeland, of Lafayette, Ind.: I claim the method described, of detaching the ropeings from the rub roller, and guiding them on their passage to the spool, in such manner as to prevent them from being unequally deflected, and thereby unequally stretched, by means of a relief and guide roller, arranged, and operating as set forth.

SCREW CUTTING DIES—By John Griffiths, of Philadelphia, Pa.: I claim the circular die with an offsett, which makes a cutting edge, which is held in position by a bolt and screw, and the threads which are cut in its periphery being parallel, instead of having a running pitch, as described.

COMPOUNDS FOR STEREOTYPE PLATES—By J. L. Kingsley, of New York city: I do not claim the mixture of the gums, gutta percha, india rubber, etc., with other non-elastic gums, resins, etc., or shellac, sulphur, etc., nor do I claim vulcanizing, nor do I use vulcanized compounds, nor do I claim mixing the elastic gums with the alkaline earths or earth proper, nor with the carbonates, nor the sulphates of these bases, as pulverized marble, plaster of Paris, epsom salts, etc., all of these things having been done before by Nelson Goodyear and others, for hardening and otherwise modifying the elastic gums, but I claim the making of stereotype moulds and plates of the raw or uncured gum, combined with the pulverized oxyde of iron and antimony, or their equivalents, as set forth.

CORN SHELLERS—By J. P. Smith, of Hummelstown, Pa.: Pa.: I claim the bevelled spring blocks or shelling bars, in separate pieces, in the manner and for the purpose set forth; but I do not claim to be the inventor of spring blocks or shelling bars.

VALVES OF ROTARY STEAM ENGINES—By J. W. Webb (assignor to Benj. Gould), of Aurora, N. Y.: I claim making two exhaust openings, such as described, separate and distinct from each other, through each steam and cut-off valve, said valves having seats on the upper as well as lower side of the steam chamber, each of said exhaust openings communicating with the exhaust chamber through apertures in the upper side of the steam chamber, which are opened and closed at pleasure, by slides, used in connection with the valves, for governing or reversing the engine.

SEED PLANTERS—By Samuel & Wm. H. Witherow (assignor to Samuel Witherow), of Gettysburgh, Pa.: We claim arranging the spring and roller within a tube, forming one end of the hopper, in such manner as to prevent any more seed from leaving the hopper than is required for planting, the whole arranged as set forth.

Also, the arrangement of the drag bar under the plow beam, and passing through the adjustable hanger, and a slot in the neck of the mould board, for the purpose of giving additional lateral support to it, and protecting it from the earth, which runs up on the mould-board, in turning the furrows, the whole being arranged and combined as described.

Coal Smoke.

The bituminous Coal Smoke seems to be particularly annoying to the Pittsburgers at the present time, the damp atmosphere having condensed the immense clouds of smoke constantly thrown out by the numerous factories of the city, and caused it to descend in showers of sooty flakes, rendering the city more than usually uncomfortable. The Gazette is agitating the institution of a commission by the City Council to inquire into the subject of remedying the trouble by causing the consumption of the coal smoke. We think the sooner the people of Pittsburg set about this, the better. The smoke is fine coal, suspended in the atmosphere—the volatile products of bituminous combustion. This smoke can be consumed in properly constructed furnaces and fire-places, and thus a saving of fuel will be effected, together with that greater blessing, a purer atmosphere.

Patent Office Report.—The Typhoductor, or Storm Pointer.

Colonel Lloyd, one of the special commissioners of the Exhibition, exhibited a very remarkable instrument, called a typhoductor, or storm pointer—an instrument for obtaining by inspection the bearing and relative position of a revolving storm or hurricane. It is now a well ascertained fact, that great storms have a rotary motion, like a whirlwind. The theory commonly called the law of storms, as made known in several publications by persons of eminence, has been established from thousands of well authenticated observations in different parts of the world, and extending over a period of several years. It proves that during a gale of wind, particularly near to the tropics, the wind blows with the greatest fury round a common centre; at this centre there is little or no wind, even a perfect calm; but there is generally a terrific and confused sea. The most violent and dangerous parts of these revolving gales are near this central calm, the wind there blowing the most fiercely, acquiring, it is stated, a velocity of even a hundred miles an hour. These storms sweep both land and sea in certain parts of the globe; their track and direction are pretty well known, and they travel bodily from their place of origin to their destination at variable speeds—sometimes at not more than four to six miles per hour; sometimes, but seldom, at that of 20 to 30 miles per hour, although the wind within their range is blowing round with the fury just mentioned.

If a ship unhappily becomes entangled within the range of these terrible gales, she is in great peril. Many have foundered, and others have pursued their fearful course round and round until they have been reduced to helpless wrecks, dismasted and water-logged. In the northern hemisphere, these winds blow round the compass from east by north, to west, or the contrary way to the hands of a watch; whereas in a southern hemisphere it is just the reverse, blowing round as the hands of a watch would go.

This principle must always be borne in mind as the very foundation of all the information to be sought hereafter. On these most valuable data, instructions have been drawn up by Colonel Reid, and others, how to ascertain the relative position of a gale, so as to know whether it is approaching to or going from a ship, travelling by its side, or crossing its path.

The object of Colonel Lloyd's ingenious instrument is, by graphic illustration, to show that when the wind blows from a particular point of the compass, you can only be in one relative position in regard to the centre of the whirl storm, so that either the storm is approaching the ship or the ship approaching the storm, and first, of course, encountering the outer edge. As a consequence of the law of rotation, the wind, supposing the whirl to be circular, must blow at a tangent or right angles to the point of the compass where the ship or observer may be, but under diametrically opposite conditions, as far as regards the two hemispheres. Thus in a northern hemisphere, if the wind blows east, the centre of the storm must be due south of the observer; blowing north, the vortex east; coming from the west, the centre of the gale is north; and, lastly, with the wind south, the gale is due west. Of course, in the intermediate points of the compass, the bearings are likewise different.

In a southern latitude the whirl-storm blows round just the contrary way. With an east wind the storm centre bears north; with a north wind, west; with a west wind, south; and with a south wind, east. Bearing in mind these facts, and with sea-room, it is easy not only to avoid hurricanes, but to make them subservient, in many cases, to the ship's ultimate course.

American Fire Arms.

From the United States three different kinds of articles in gunnery only were exhibited. These were the common army rifle, Colt's revolvers, and Maynard's primer.—The first of these, manufactured by Robbins & Lawrence, of Windsor, Vt., received much approbation for the excellent quality of their material, and the thoroughness and completeness of their workmanship. The second article mentioned, Colt's revolver, probably gained a further hold in the estimation of the best judges of fire-arms than any piece of gunnery which has been invented the last fifty years. Though it had been long in use with us, both for army and sporting purposes, it seems not to have been known in England. Meeting with doubts upon its first presentation at the Exhibition, it gradually gained its way into favor, until, before the close of the Crystal Palace, it was universally acknowledged to have achieved a success unequalled by a single invention from any part of the world.

Hardly second to the revolver in the impression made upon the public mind was Maynard's primer. This most ingenious and effective piece of mechanism, the very simplicity of which is its greatest wonder, when applied to fire-arms of any model, increases their efficiency to a degree which, to be fully realized, must be personally witnessed. Too late in its arrival at the Exhibition to be passed upon by the jury of awards, it received, nevertheless, from scientific men, army officers, and professed sportsmen, a meed of approbation that far exceeded any renown it could have acquired from the medal or mention of excellence.

The detonating principle of Maynard's primer is in the form of little lozenges, each about one sixth of an inch wide, and one thirtieth of an inch thick. These lozenges are enclosed between two narrow strips of strong paper, cemented together and rendered waterproof and incombustible. The single strip thus made is a little less than one-fourth of an inch wide, and contains four of these lozenges (each of which is a charge,) in every inch of its length; the charges forming projections of their own shape on one side, leaving considerable and equal spaces between them; the other side of the strip being one flat surface.

One of these strips, containing fifty (or more or less) charges, is coiled up and placed in a magazine in the lock, where, by opening a lid, it can be inspected readily, and from whence it is fed out by the action of the lock, one charge being moved forward each time the hammer is raised. When the hammer descends it cuts off and fires the charge fed out upon the nut (or nipple, if one be used) of the gun, thus igniting the powder of the cartridge in the barrel.

These primers are made by a very simple machine, (also invented by Dr. Maynard,) capable of making a million a day, at about one-tenth the cost of the percussion caps heretofore used in the United States army and navy.

The above is from the Report of E. Riddle the American Commissioner at the World's Fair. We will be able to select from time to time some other interesting extracts from it.

Winds and Currents of the Sea.

Lieut. Maury, U. S. N., of the National Observatory at Washington, delivered a lecture at the Tabernacle, this city, on the 12th inst., being one of the "Peoples' Course of Lectures." The above caption was the title of the lecture. The audience was large, for the fame of the lecturer is world-wide, his researches into the winds and currents of the sea have gained for him a great scientific reputation. Lieut. Maury was dressed in the naval uniform. He is about the medium size, firm, square, and compactly built, and like many men who have been greatly distinguished—he is lame—has a halt in his walk. He is of a fair and ruddy countenance and not over 45 years of age, we should conjecture. He has a broad open forehead, brown hair, fine manly face, and has a modesty of demeanor, no fustian rant nor cant about him. His voice is clear, but he is not an orator, although much of his language is poetry, lofty and sublime.

His lecture was divided into two distinct heads. He could not in one brief hour but touch on the salient angles of his subject.—The one idea was, the sea being salt was the cause of currents, which, if it were fresh would not have an existence. The other was that marine animals and plants were the causes of currents in the sea.

By the great evaporation in the equatorial regions only fresh water is lifted up, which leaves the salt water of the ocean denser than it was before, and the heavier particles rushing in to supply the place of the lighter is the cause of motion in the sea. The waters carried in clouds from the evaporating regions are condensed in other regions, especially the polar, and flow down in the rivers, to the northern ocean, and then the fresh water being lighter, flows on to the equator on the surface, while the denser salt water floats from the equator to the arctic ocean. Lieut. De Haven while on the Grinnell expedition, saw a huge iceberg floating away by an under current, while he was drifting in an opposite direction by a surface current. Owing to the sea being salt, we have those currents, which in the arrangement of Providence carry warm showers to fertilize regions, that otherwise would be inhospitable and barren.

The waters which are carried into the sea, bear down limous matters; these are taken up and secreted by coraline insects, which, as they build their marine palace walls, turn aside the billows from former courses, and direct the ways of the mighty waters. Lieut. Maury said that whenever he found in the Bible a foundation for any theory, he was sure to go on in eliminating scientific truth. He paid it the humble but noble tribute of a great mind, as being the most scientific of all books, because it was the product of the Author of all science.

Atlantic Steamships.

The passages across the Atlantic have been very stormy this winter. The new steamship Arabia (of the Cunard line) which arrived at this port on the 16th inst., put into Halifax for coal, having been fifteen days on her passage. She is a fine steamer, and having done so well on her trip between Glasgow (where she was built) and Liverpool, we understand that it was asserted she would make a very short passage. A great number of bets, we have been told, were made in our city between different parties, that she would make a shorter voyage than the Baltic, which sailed three days before her. The Baltic made a shorter passage by two days. The last ferry trip of the Pacific from Liverpool, took more than 16 days, and that of the Asia 18, the latter also put into Halifax for coal. We believe these are the first instances of the Cunard New York steamers putting into Halifax. It is somewhat to the credit of propellers that the Glasgow steam propeller beat the Asia on her last voyage more than one day, thus making a voyage nearly equal to that of the Pacific. When we consider that her engines are only 400 horse-power, not one-fourth the actual power of the Asia's or Pacific's, we confess that this ship deserves to carry a broom on her topmast.

Shipping Coal.

Many of the coal shippers of Richmond, Va., have been, and are, exporting coal to Havana, and other tropical climates, packed in large hogsheads, which, upon their arrival at the destined ports, are emptied, filled with sugar and molasses, and re-exported to the United States. This is a new idea, and causes a vast saving to both manufacturers and consumers, as formerly it was the custom to export the staves and hoops, and have the hogsheads put together on the plantations, where coopers' wages are much higher than here; saving in that and likewise in the transportation, which has generally been considered an important item in our commerce.

A Crystal Palace project is in agitation at Boston.

TO CORRESPONDENTS.

H. W. G., of N. C.—We published a description of a flying ship in Vol. 1, Sci. Am., of a double cone form; bird-form balloons have been tried before. The same ideas as those you have presented have been carried out in the parachute. We assure you that the only theory to attract attention and command success is to do the thing.

J. T., of C. W.—Look on another page for something suitable as an answer to your letter.

C. B., of N. Y.—There is a book sold by J. Wiley, this city, named the "American House Carpenter;" there is also "Downing's Cottage Architecture," and Ranlett's. If there is a bookseller in your place he will be the best person to get them for you.

J. R., of Mich.—Your improvement in working muley-saws, we believe, is good—so far as we can learn, it appears to be new and patentable.

J. Z. F., of N Y.—Instruments for measuring the height of mountains and the depression of valleys, are very common, but you may have an improved apparatus notwithstanding.

J. F., of Conn —We never heard of steel being cast into files, or any thing of the kind.

J. S., of Mass.—We have not a copy of the numbers on hand ordered by you.

A. F. S., of Ga.—We are glad the Ear Trumpet sent to you in 1849 pleased you, but we cannot be at the trouble of superintending the construction of another; we are not in the "trumpet" business at present.

S. H., of Wis.—The novelty of your arrangement of the friction rollers we fail to perceive, your assertion to the contrary notwithstanding; we would not advise you to make an application for a patent.

B. F. C., of Ky.—We should be very happy to receive communications from you on the subject of Kiln Drying, and plans of your mode of constructing the furnaces we could probably publish.

A. M. B., of Vt.—For raising very heavy weights, such as placing masts in a ship, or boilers on board a steamer, shears, and not a derrick, are preferably employed.

W. H. C., of Mo.—By sending us $2 we will forward you the claims of both the parties. Patent Laws sent.

P. L F., of R. I.—Send on your model.

H. M. & Co., of Mass.—There is no doubt but that both of the inventions are good, and you had better address the parties *direct*—not through us.

C. B., of Ga.—On page 76, Vol. 6, Sci. Am., you will see an engraving of a mechanical cradle, which we believe to be precisely like your plan; it was patented.

J. C. R , of Pa.—Jennings' rifle is no doubt a good one, but we are not so well acquainted with it as with Marston's, the latter we know to be first rate.

C. B. G., of Wis.—It requires but about one horse power to drive an Alcott lathe, and it will turn out 400 fork or 1500 broom handles per diem.

L. G., of N. Y.—There is scarcely a doubt but that your improvement in railroad axles is new and patentable, but we would not venture an opinion as to its practicability.

C. B. H., of N. Y.—The plan you suggest for preventing railroad accidents has been well known to us for two years. A patent was taken out for enclosing the axle in a case; the *principle* being precisely the same as Mr. Finch's wheel, illustrated in the last number; the construction is different of course.

J. C. B., of N. H.—We can give you no better information than we have already done, and if you wish to satisfy yourself as to the utility of the invention, you had better give it a practical test.

L. W. J., of Iowa—Your friend's plan for changing motion is a device on which, no doubt, twenty applications for patents have been made already. There is nothing new in it

W. D. A., of Ohio—If you have a plan by which trains of cars running at the rate of 40 miles per hour, can be kept in communication with each other by telegraphing, you no doubt have an important invention. The Telegraph is owned and used by some R. R. Companies now, for their convenience, but the communications are only made from the stations—not from the train. You should secure your patent at home and abroad, simultaneously.

I. D., of Ohio—The diagram of your hair beater represents a patent churn we had exhibited to us last year. There is nothing patentable in your apparatus.

A. M., of Phila.—An engraving of your machine would cost $12. We have a specification and drawing of it, so if you desire us to get up the views on wood you have but to send us the money.

J. H. G., of Pa.—Your caveat was filed April 1st, 1852.

D. H. S., of Pa.—We do not know of a single useful work on tin and coppersmithing. Give your zealous attention to the practical part of the business, and become a good workman; and read useful works.

J. W., of N. Y.—The copper plates for daguerreotype pictures are made by rolling, but being imported we do not know the price of the machinery.

J. W., of Mich.—By hard water we suppose you mean that impregnated with lime; it is healthy if the lime is in minute quantities. Magnesian waters are unhealthy. Lead pipe is safe with your "hard" water; cast-iron pipes are employed for our "main" pipes. They will last for a long time and are not liable to oxydize, but wrought iron pipes are not suitable.

J. G., of Boston.—We receive all our claims officially from the department, and always publish all that are sent to us. We can never be induced to suppress any one's claims under whatever pretence they may advance.

D. M. D., of Pa.—We know of no better work on millwrighting than those you mention as having.

M. K., of Mass.—Your plan of tightening millstones is the ordinary plan used in nearly all modern built mills. Your tack hammer may be new, send one on that we may examine it.

G. W. L., of Pa.—We have examined the model of your wheel. It contains nothing new or patentable, and you are advised not to make an application.

G. L. L., & Co., of Ohio.—We think your improvements in candle moulds to be new and patentable. You had better send a model

J. M. N., of Pa.—Your plan for a perpetual motion is excellent, but it won't go. It cannot be that you are a *careful* reader of the Scientific American, or you would know better than to submit diagrams of a perpetual motion for our opinion.

J. M. G., of Va.—Steamboat wheels with the paddles so arranged as to enter the water vertically, is about as old an invention as we know of.

F. S., of Conn.—We have not the information you want now, if we obtain it you may expect to see it in print for your benefit.

W. H. M., of Ind.—We can execute and publish an engraving of your machine for $12.

Money received on account of Patent Office business for the week ending Saturday, Jan. 22:

C. & R., of N. Y., $15; J. M., of Me, $10; C. S. B., of L. I, $10; J. R. N., of N. Y., $30; H. B., of N. Y., $100; I. P. W., of Mass., $30; G. S., of Conn., $10; W. Z., of Ill, $55; A. H. B., of N. J., $150; H. T., of N Y., $50; D. E, of Conn., $25; W. S. P., of Ct., $25; S. R. & H., of N. Y., $40; H. E., of N. J., $27; J. E. E., of N. Y., $55; P. G. G., of N. Y., $55.

Specifications and drawings belonging to parties with the following initials have been forwarded to the Patent Office during the week ending Saturday, Jan. 22:

J. R., of N. J. (2 cases); D. E., of Conn.; W. S. P., of Conn.; T. S, of Ohio; J. E. E., of N. Y.; H. E., of N. J.; B. H., of N. Y.; P. G. G., of N. Y.

ADVERTISEMENTS.

Terms of Advertising.

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16 " " "	- -	$2,00

Advertisements exceeding 16 lines cannot be admitted; neither can engravings be inserted in the advertising columns at any price.

☞ All advertisements must be paid for before inserting.

American and Foreign Patent Agency

IMPORTANT TO INVENTORS.---The undersigned having for several years been extensively engaged in procuring Letters Patent for new mechanical and chemical inventions, offer their services to inventors upon the most reasonable terms. All business entrusted to their charge is strictly confidential. Private consultations are held with inventors at their office from 9 A. M., until 4 P. M. Inventors, however, need not incur the expense of attending in person, as the preliminaries can all be arranged by letter. Models can be sent with safety by express or any other convenient medium. They should not be over 1 foot square in size, if possible.

Having Agents located in the chief cities of Europe, our facilities for obtaining Foreign Patents are unequalled. This branch of our business receives the especial attention of one of the members of the firm, who is prepared to advise with inventors and manufacturers at all times, relating to Foreign Patents.

MUNN & CO., Scientific American Office,
128 Fulton street, New York.

THE STOWELL EVERGREEN SWEET CORN A few bushels of this new and valuable variety; from seed raised by Professor J. J. Mapes, L. L. D., for sale. Per bushel, $10; peck, $5; half peck, $3, quart, $1; sent by express to any part of the country, on receipt of the money by mail. This is beyond all doubt the best and most prolific kind of Sweet Corn ever grown. No farmer should be without it. One of the advantages claimed for this corn by Professor Mapes, is that it may be kept green and fresh all the year round. The subscriber's limited experience, however, does not enable him to endorse this. Address, post paid, ALFRED E. BEACH, White Plains, Westchester Co, N. Y.

[Prof. Mapes, in the "Working Farmer," December, 1851, gives the following directions for preserving the Stowell Evergreen Sweet Corn:—

"The ears should be gathered when fully ripe, and the husk should be tied at the nose (silk end), to prevent drying, when the corn will keep soft, white and plump for more than a year, if in a dry and cool place. At the dinner of the Managers of the fair of the American Institute, last year, we presented them with this corn of two successive years' growth, boiled, and there was no perceptible diifference between the two. This year we sent to the fair a stalk containing eight full and fair ears, and we could have sent many hundred stalks of six ears each." 20tf

A RARE CHANCE FOR MAKING A HANDSOME FORTUNE.—Any person wishing to take an interest in a very valuable patent right for the New England States, and having one or two thousand dollars capital (one that has already been introduced and pays two or three hundred per cent) will please address H. J. B., Post Office, New York City. 1*

TO MECHANICS—A RARE CHANCE—FOR sale or to let, a building 60x90, with a 15 horse engine, shafting and pulleys, 5000 feet yard room, near the depot of the Kennebec and Boston R. R., in Brunswick, Me., 6 hours from Boston; is one of the best locations in the States for building freight cars or making furniture, or any other manufacture of lumber, being in the heart of a ship building and lumber country; will be sold a bargain, the owner not being in circumstances to manage it. Also, the right to Woodbury's planing machine for Brunswick and Bath. Apply by letter, post-paid, or in person, to
18 2eow* NARCESSA STONE.

THE UNDERSIGNED manufacture Patent Cast-Iron Screw Pipes, of 3-4, 1, 1 1-4, 1 1-2, 1 3-4, 2, 2 1-2, and 3 inches in diameter—now in extensive use for gas, steam, and water, being cheaper and more durable than copper, lead, or wrought-iron pipes, and available for the same purposes. This pipe has been largely used in conducting water to railroad stations, also in tanneries, distilleries, pork and sugar houses, in conducting water or steam, and as suction pipe for pumps, for which, where long lines are required, it is peculiarly fitted, from its durability, cheapness, and the excellence of the screw-joints. We also make Solid Hub Railroad Car Wheels, by Murphy's process, using the utmost care in selecting metal for the purpose, with reference to strength and chilling properties. Also small steam engines, mill machinery, cotton presses, tobacco-screws and presses, lard, timber, and mill screws; force and lift pumps of various sizes and kinds, for hand use or power. Cast-iron railing. Roys & French's Patent Hub Mortising Machine, which will lay off, bore, and mortise a hub of ordinary size in 15 minutes, turning it out completely finished, the mortises having any required disc.

TEVIS & BARBAROUX,
corner of Washington and Floyd streets,
20 5* Louisville, Ky.

BRIDGEWATER PAINT MANUFACTURING COMPANY DEPOT, 125 Pearl and 78 Beaver streets, New York, have on hand a large supply of this paint, and are prepared to receive orders for dry packages of 200 lbs. and upwards, and in oil of assorted colors in kegs of 25, 50, and 100 lbs. For wood, iron, stone, and brick work, it has no equal. Painters are using it with great success on brick buildings (the natural color resembling brown stone), on tin, canvas, or shingle roofs, villas, barns, fences, depot buildings, railroad cars, bridges, &c.; also for decks and bottoms of vessels. The black has been found superior to any other, for hulls of vessels, being more durable, possessing a greater body and cheaper. From its spark and cinder-proof qualities, it is well adapted to all kinds of wood-work, where there is danger from fire. Testimonials of its virtues, and specimens on wood, tin, canvas, &c., may be seen at the depot. Letters must be addressed to
20 4* R. BOGERT, General Agent.

E. HARRISON'S UNEQUALLED FLOUR AND GRAIN MILLS—Their frames and hopper are cast-iron, and the stones French Burr, 30 inches in diameter; grinds of wheat and corn 20 bushels an hour, weighs 1400 lbs.; cash price $200. These mills, constructed upon a new principle, have become widely known, and are producing a revolution in milling. Cast orders promptly supplied, and the mills warranted to work in the best manner. The patentee offers $500 reward for any mill which will do an equal amount of work with the same power and dressing. Made and for sale at the corner of Court and Union streets, New Haven, Conn, by
20 12* EDWARD HARRISON.

BACK VOLUMES OF THE SCIENTIFIC AMERICAN for sale—Vols. 2, 5, 6, and 7, complete, price $2,50 per volume.; Vol. 3, less 10 or 12 numbers, and Vol. 4, less 4 or 5 numbers; price $1,50 each; all bound and in good order. Address, post-paid. F. S. BURRELL, Albany, N. Y. 19 4*

1852 TO 1856.----WOODWORTH'S PATENT Planing, Tongueing, Grooving, Rabeting, and Moulding Machines.—Ninety-nine hundredths of all the planed lumber used in our large cities and towns continues to be dressed with Woodworth's Patent Machines. Price from $150 to $760. For rights in the unoccupied towns and counties of New York and Northern Pennsylvania, apply to JOHN GIBSON, Planing Mills, Albany, N. Y. 1amtf

SURFACE CONDENSERS—Having built and used at our machine shop and foundry one of J. M. Miller's Surface Condensers for the last 14 months, we are now prepared to receive orders for building and putting up said condensers on either high or low pressure engines now in use, and warrant the same against expansion and contraction of the metals, also the injurious effects of oil in the tubes, which alone has caused the failure of condensers heretofore used. We have also found, in the use of our Condenser a nett saving of 30 per cent. of fuel, the water being kept pure and regular in the boiler by the condensation of the steam. In our judgment this Condenser is the perfecting of the Steam Engine. COBB, MASON & HILL,
North Point Foundry and Machine Works,
18 4 Jersey City, N. J.

W. P. N. FITZGERALD, Counsellor at Law, has recently resigned the office of principal Examiner of Patents, which he has held for many years, and is ready to assist, professionally, in the preparation and trial of patent causes before the U. S. Courts in any of the States, and before the Supreme Court of the United States. He also acts as Counsel in cases before the Patent Office, and on appeals therefrom, but does not prepare applications for Patents Office corner of E and 8th sts., Washington, D. C. 18 tf

PATENT DRAFT BOARDS—With extension scales, sheet fasteners, and T rule. See Reports of Worcester Fair, Maryland State Fair, &c. &c, with their awards. $10 complete. Sent by express. Address, post-paid, CHAMBERLIN & CO., Pittsfield, Mass. 16tf

C. B. HUTCHINSON'S PATENT STAVE Cutting Machines, the best in use, and applicable alike to thick or thin staves; also his Head Cutting and Turning, and Stave Jointing Machines.

For machines or territorial rights, apply to C B. HUTCHINSON & CO., Syracuse, N. Y. 9tf

STEAM ENGINES FOR SALE—We offer for sale two Engines and Boilers, as follows: one 8 horse, horizontal, cylinder 7 inches bore, 16 inch stroke, on a cast-iron bed, fly wheel, driving pulley, governor, pump, pipes, etc.; has never been used. The Boiler has been used by the maker about one year. It is cylinder, horizontal, 16 feet long, 30 inch diameter, has a steam chamber, try-cocks, check and safety valves: price, $600.

One 7 horse Horizontal Engine, 6 inch bore, 16 inch stroke, cast-iron bed-plate, driving pulley, etc. Boiler horizontal, tubular, and has everything complete for putting it in operation. The engine is new, the boiler has been used, but is in good order. Price $500. They are rare bargains, and will give satisfaction to the purchaser, being much less than new ones can be obtained. Address MUNN & CO.

THE TROY IRON BRIDGE CO. are prepared to erect Iron Bridges or Roofs, or any kind of bearing trusses, girders, or beams, to span one thousand feet or under, of any required strength, in any part of the country. Their bridges will be subjected to severe tests, and can be built for about the price of good wooden ones. Address BLANCHARD & FELLOWS, Troy, N. Y. 7 20*

BEARDSLEE'S PATENT PLANING Tongueing and Grooving Machines—These celebrated machines have now been generally introduced in various portions of the United States. More than thirty are now in successful practical operation in the State of New York alone. As an illustration of the extent of work which they are capable of performing, with unrivalled perfection, it is sufficient to state that, within the last six months and a half, over five millions of feet of spruce flooring have been planed, tongued and grooved by one of these machines at Plattsburgh, N. Y., never running to exceed ten hours a day. The claim that the Beardslee machine was an infringement upon the Woodworth patent, has been finally abandoned; and after the proofs had been taken, the suit instituted by the owners of that patent was discontinued, and the whole controversy terminated on the first of November last. Applications for machines or rights may be made to the subscriber, GEO. W. BEARDSLEE, 57 State street, or No. 764 Broadway, Albany. 15tf

EXHIBITION OF WORKS OF AMERICAN Industry at Washington City.—The first exhibition of the Metropolitan Mechanics' Institute will be opened on Thursday, the 24th of February, 1853, in the new and splendid hall of the east wing of the Patent Office, one of the largest and most magnificent rooms in the United States, being 275 feet long by 70 feet wide. To this exhibition the manufacturers, mechanics, artists, and inventors, from all portions of the Union, are cordially invited to contribute. The hall will be opened for the reception of goods on Monday, tha 14th of February, and the exhibition will positively close on or before Thursday night, March 17. Circulars, containing detailed instructions, will be forwarded and any further information given, on application (post-paid) to the Corresponding Secretary, Charles F. Stansbury, to whom all communications on the business of the Institute should be addressed 8tf

WOODBURY'S PATENT PLANING Machines —I have recently improved the manufacture of my Patent Planing Machines, making them strong and easy to operate, and am now ready to sell my 24 inch Surfacing Machines for $700, and 14 inch Surfacing Machines for $650 each. I will warrant, by a special contract, that ONE of my aforesaid machines will plane as many boards or plank as two of the Woodworth machines in the same time, and do it better and with less power. I also manufacture a superior Tonguing and Grooving Machine for $350, which can be either attached to the Planing Machine, or worked separately. JOSEPH P. WOODBURY, Patentee, Border st, East Boston, Mass. 13tf

MACHINERY.—S. C. HILLS, No. 12 Platt-st. N. Y. dealer in Steam Engines, Boilers, Iron Planers, Lathes, Universal Chucks, Drills; Kase's, Von Schmidt's and other Pumps; Johnson's Shingle Machines; Woodworth's, Daniel's and Law's Planing machines; Dick's Presses, Punches and Shears; Morticing and Tennoning machines; Belting; machinery oil, Beal's patent Cob and Corn mills; Burr mill and Grindstones; Lead and Iron Pipe &c. Letters to be noticed must be post-paid. 13tf

A. B. ELY, Counsellor at Law, 52 Washington st., Boston, will give particular attention to Patent Cases. Refers to Munn & Co., Scientific American. 16tf

LEONARD'S MACHINERY DEPOT, 109 Pearl-st. and 60 Beaver, N. Y.—Leather Banding Manufactory, N. Y.—Machinists's Tools, a large assortment from the "Lowell Machine Shop," and other celebrated makers. Also a general supply of mechanics' and manufacturers' articles, and a superior quality of oak-tanned Leather Belting.
7tf P. A. LEONARD.

PAINTS, &c. &c.—American Atomic Drier Graining Colors, Anti-friction Paste, Gold Size, Zinc Drier, and Stove Polish.
QUARTERMAN & SON, 114 John st.,
1tf Painters and Chemists.

LATHES FOR BROOM HANDLES, Etc.—We continue to sell Alcott's Concentric Lathe, which is adapted to turning Windsor Chair Legs, Pillars, Rods and Rounds; Hoe Handles, Fork Handles and Broom Handles.

This Lathe is capable of turning under two inches diameter, with only the trouble of changing the dies and pattern to the size required. It will turn smooth over swells or depressions of 3-4 to the inch and work as smoothly as on a straight line—and does excellent work. Sold without frames for the low price of $25—boxed and shipped with directions for setting up. Address (post.paid) MUNN & CO.
At this Office.

FALES & GRAY (Successors to TRACY & FALES), RAILROAD CAR MANUFACTURERS—Grove Works, Hartford, Connecticut. Passenger, freight, and all other descriptions of railroad cars and locomotive tenders made to order promptly. 1tf

SHINGLES, SHINGLES, SHINGLES—WOOD'S latest improvement in Shingle Machines is becoming more generally used than any other ever invented, and is unquestionably the best machine now in use; it produces shingles from all kinds of timber in a very perfect and rapid manner. Machines and rights for sale. Apply to JAMES D. JOHNSON, Bridgeport, Ct. 9tf

J. D. WHITE'S PATENT CAR AXLE LATHES —also Patent Engine Screw Lathes, for boring and turning tapers, cutting screws, &c. We manufacture and keep constantly on hand the above lathes; also double slide Chuck and common Hand Lathes, Iron Planers, S. Ingersol's Patent Universal Ratchet Drill, &c. Weight of Axle Lathe, 5,500 lbs; price $600; Engine Screw Lathe, 1400 to 7,000 lbs; price $225 to $675, BROWN & WHITE,
15tf Windsor Locks, Conn.

NEW HAVEN MANUFACTURING COMPANY, Tool Builders, New Haven, Conn., (successors to Scranton & Parshley) have now on hand $25,000 worth of Machinist's Tools, consisting of power planers, to plane from 5 to 12 feet; slide lathes from 6 to 18 feet long; 3 size hand lathes, with or without shears; counter shafts, to fit all sizes and kinds of universal chuck gear cutting engines; drill presses, index plates, bolt cutters, and 3 size slide rests. The Co are also manufacturing steam engines. All of the above tools are of the best quality, and are for sale at 25 per cent. less than any other tools in the market. Cuts and list of prices can be had by addressing as above, post-paid. Warehouse No 12 Platt st., New York, S. C. HILLS, Agent N. H. Man'g Co. 19tf

SCIENTIFIC MUSEUM.

Analyzing Oils with Sulphuric Acid.

At the last meeting of the French Academy of Sciences, the following communication was presented by M. Dumas, from M. Maumene, on the above subject. The fatty oils mingled with sulphuric acid disengage heat, thus action may serve to distinguish them; it separates in a striking manner the drying oils from those that are not so. Fifty grammes of olive oil having been placed in an ordinary test glass, the temperature of which was known by plunging a thermometer in the liquor, there were carefully dropped into it 10 cubic centimetres of sulphuric acid at the temperature of 66° (Baume). While mixing the liquids the thermometer was shaken, and the rise of the mercury noted. Beginning with the temperature of 25° for the oil and acid, the thermometer rose to 67°—increase, 42°. The mixing does not take more than two minutes, only one minute is required to obtain the maximum temperature.

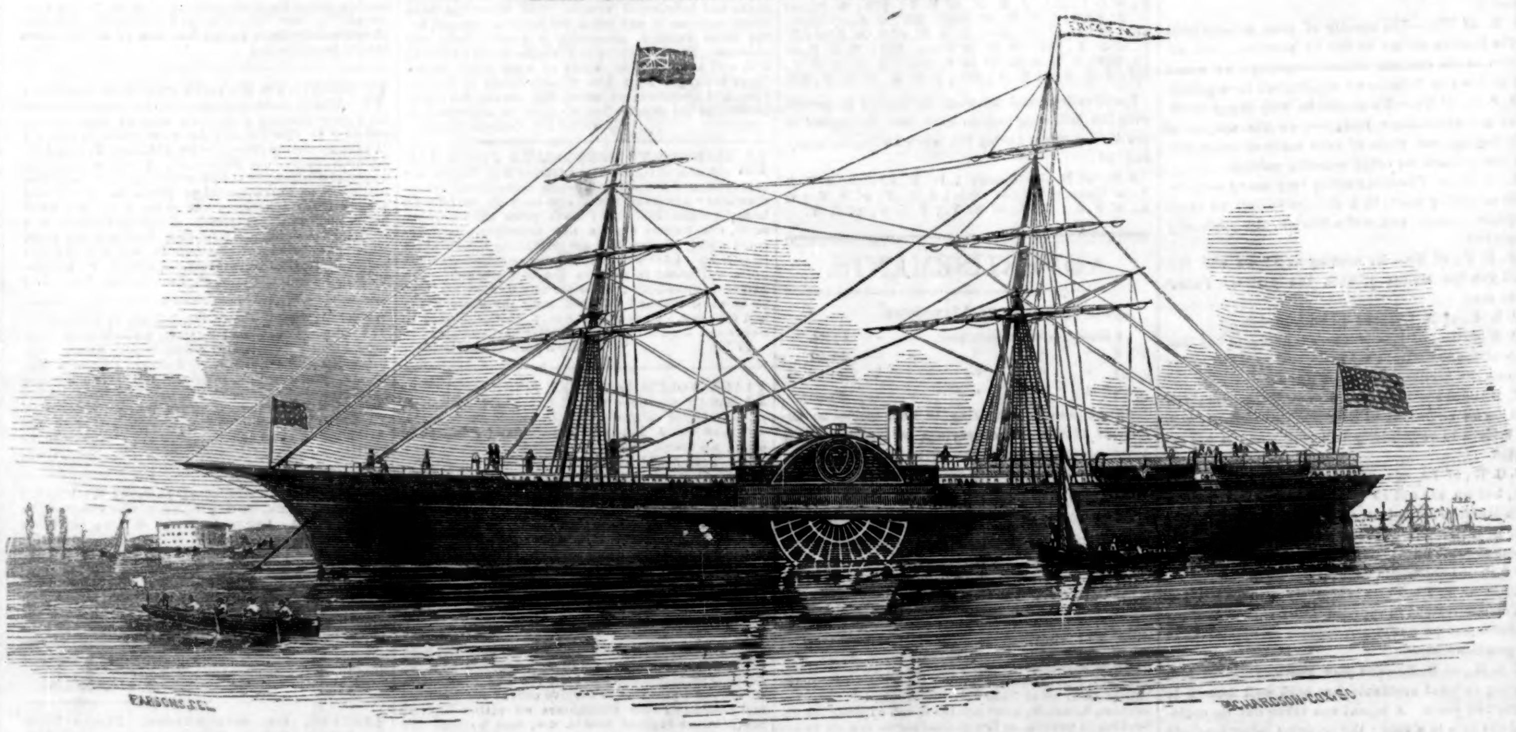
In another similar glass there were placed 50 grammes of oil of poppies, and it was likewise tested with sulphuric acid, the thermometer rose from 26° to 100°·5—increase, 74°·5. In this instance there was noticed, firstly, a very remarkable developement of sulphurous acid, not caused by olive oil; and, secondly, a very great bubbling up of the liquid. On account of these two circumstances, the figure 74°·5 is too small. The difference between 42° and 74°·5 is sufficiently great to present a mode of analysis.

The experiment repeated several times under the same conditions, with the same olive oil, gave each time the same developement of heat at 42°. The experiment made with different sorts of olive oil, from various sources, proved that the action of the sulphuric acid is constant when the oil is pure, and when made with a similar degree of heat. The action of the acid is not less constant with the oil of poppies; experiments, moreover, prove that the developement of heat due to this oil is really at 88°·4, instead of 71 or 74 degrees, as the direct experiment indicates. This process of analyzing may be applied to the olive oils of commerce; these oils are often adulterated only with oil of poppies, and in such a case their analysis can be made with certainty, if their qualitative composition is sure. But how would it be in case of other oils? In answer to this inquiry, I have fixed the rise of temperature produced by most pure oils, it results from my researches that the oil of ben and oil of tar furnish almost the same disengagement of heat as olive oil. That the other oils produce a much greater disengagement of heat by means of which they can easily be distinguished from olive oil. Finally, that the drying oils give much more heat than the non-drying oils, and may be easily known. The oil of ben and of tar cannot be mixed with olive oil, consequently, whenever olive oil gives more than 42° of heat in its mixture with 10 cubic centimetres of sulphuric acid (at 25°) their oil is not pure. The preceding appears sufficient to show the use that may be made of sulphuric acid for analyzing oils. In mixtures composed only of two oils, the employment of this acid will very much help in determining its quality. When the qualitative analysis has been made the quantity may often be declared with precision.

LITERARY NOTICES.

THE MILK TRADE OF NEW YORK—By John Mullaly: Fowlers & Wells, pp. 118.; price 25 cts. An excellent little treatise on the Milk Trade of New York, an article that forms so important an item in the food of mankind. The author gives some useful statistics, and shows the injurious effects of using what is commonly called "swill milk," which, as is well known, is obtained from cows stabled in the city and fed on the refuse from brew-houses and distilleries. An exposure of this system of supply so deleterious to the health of our citizens was very much wanted, and we hope that this pamphlet will be read by every one.

THE CALORIC SHIP "ERICSSON."



The above is a view of the Caloric Ship "Ericsson." On her first trial trip she had a fair wind, and the tide in her favor. She is now lying at "Green Point," there being something not complete about her machinery. For a full description and history of the Hot Air Engine, see first page. We are indebted to the N.Y. "Illustrated News," for the above cut.

Burning Fluid and Safety Lamps.

We have received a letter from a correspondent in Boston, containing an article from the "Haverhill Gazette," Mass., on the above subject. The author of it is evidently well acquainted with his subject, and it is one of much importance to the community.

The article in question says, "I have made a full investigation of the chemical character of the various liquids sold by dealers for the purposes of artificial illumination, and have subjected these compounds, and the lamps designed to be used with them, to very accurate experiments. Dangerous frauds have been continued for years by unprincipled men in the sale of those compounds without exposure." He asserts that a mixture of turpentine and alcohol, colored with turmeric, has been sold by dealers for years, under the name of "vegetable oil," with the unblushing assertion that it was *perfectly safe and unexplosive*. This mixture afforded by the distiller at 50 cents per gallon, at once in the hands of an unscrupulous dealer advances from 50 cents to 70 cents per gallon, by adding one cent's worth of turmeric to it, and changes from a volatile dangerous hydrocarbon or burning fluid to the *safe* vegetable oil. Such are some of the tricks of trade. Every case of this kind should be punished with severity. The author (we do not know him,) of the article in question, states that Newell's wire gauze lamp, which has been noticed in the Scientific American, is but a modification of the one patented by Isaiah Jennings, of this city, N. Y., in 1836, and the question is asked of us, if this is true, as Newell's has been sold for a *patent lamp*. We are not aware of any patent having been granted for it, and we cannot discover that one was granted to I. Jennings in 1836, but there was one in 1841, which combined a cotton percolator and wire between the fluid chamber and the flame. All volatile hydrocarbons are explosive, that is, any fluid employed for giving light, if it evaporates at a low heat, and this vapor is suffered to mix with the atmosphere it becomes an explosive gas. None of what are called the explosive fluids will explode until they become vaporized, it is the vapor, not the fluid, that is the cause of explosions. The author of the article in question asserts that in the lamps of Newell which he saw, there were orifices in the cap, made, as he was informed, at the suggestion of Dr. Jackson, for the purpose of letting off the vapor—a safety valve. If these lamps have small holes in their caps, it is a scientific blunder, for the grand object to prevent lamp explosions is to exclude the air. The pressure of heat from the vapor of an apartment, can never be so great as to explode the lamp. The safety of such lamps depends upon excluding the fluid and vapor from the atmosphere. A perfectly tight lamp never yet exploded. As we have stated more than once, we say it again, fluids should never, under any conditions, be used in a house where there are children or servants.

In this vicinity there is a dangerous burning fluid sold, by the name of "Rosin Oil," under the pretence that it is a safe unvolatile hydrocarbon. Five minutes before writing this, we examined some of this "Rosin Oil," which the purchaser supposed was something very different from a turpentine mixture: thus people are often deceived by names. There is an oil made from rosin by its destructive distillation, but not a burning fluid.

Drainage of a Lake by an Earthquake.

A singular phenomenon lately occurred in California, by which Lake Merced, a sheet of water, covering about thirty acres, and which is situated seven miles distant from San Francisco, threatens to become dry ground. A shock of an earthquake took place during the night, and in the morning it was discovered that a portion of the lake's boundary had been swept away, and a passage forced by the rushing waters about three hundred yards in width, and ten or twelve feet deep, opening on the sea shore to the width of a mile. Subsequently, a sort of mid-channel has been formed, commencing a short distance below the origin of the outlet, narrower and much deeper than the first, down which the water seems to have rushed with much velocity, until the lake has been emptied at least thirty feet below its previous surface. This mid-channel has gradually deepened in the centre, forming an outlet down which the waters are yet flowing into the ocean. And now that the outlet has been forced, from its abrupt sides may be seen flowing the gaseous fluids which succeed earthquakes among lofty mountains. It is supposed that the bed of the Lake may have been instantly uplifted, and as quickly have returned to its customary level; thus forcing an outlet through the heavy alluvial by which it was formerly confined.

Erratum.

In the description of the Safety Railway Truck, illustrated on the front page of last week's paper, the address of the patentee, A. L. Finch, should have been New Britain, Conn., this is the more essential because there are two "Britains" in that State.